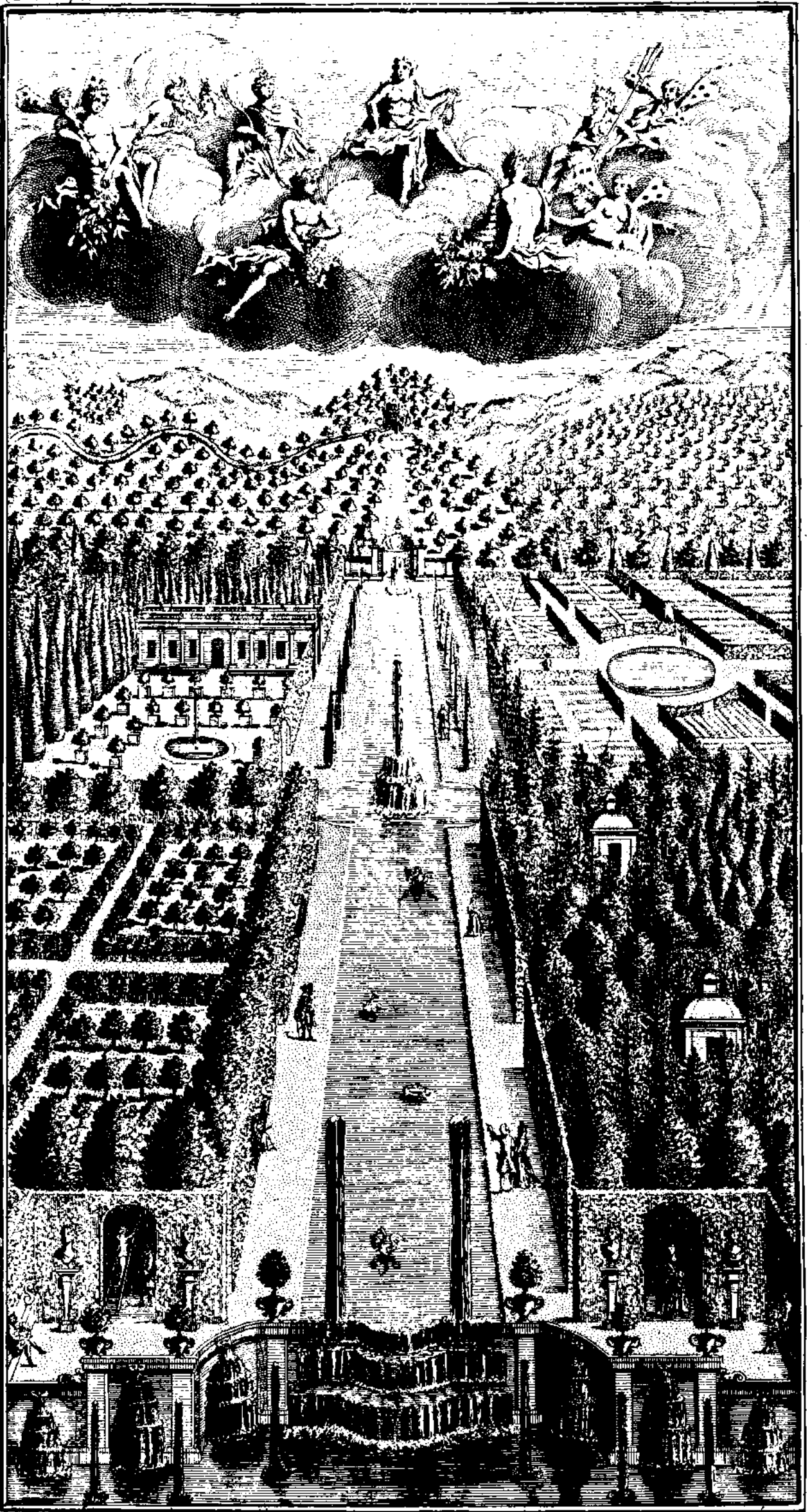




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1305/66





GEORGE R.



GEORGE the Second, by the Grace

of GOD, King of Great Britain, France and Ireland, Defender of the Faith, &c. To all to whom these Presents shall come, Greeting. Whereas PHILIP MILLER Gardener to the Company of Apothecaries at their Botanick Garden at Chelsea, and Fellow of the Royal Society, and CHARLES RIVINGTON of Our City of London, Bookfeller, have humbly represented unto Us, that they have, with great Labour and Expence, published a Book Entitled [*The Gardener's Dictionary, containing the Methods of cultivating and improving the Kitchen, Fruit, and Flower Garden; as also, the Physick Garden, Wilderness, Conservatory, and Vineyard, according to the Practice of the most experienced Gardeners of the present Age; interspersed with the History of the Plants, the Characters of each Genus, and the Names of all the particular Species in Latin and English; and an Explanation of all the Terms used in Botany and Gardening: Together with Accounts of the Nature and Use of Barometers, Thermometers, and Hygrometers, proper for Gardeners; and of the Origin, Causes, and Nature of Meteors; and the particular Influences of Air, Earth, Fire, and Water, upon Vegetation, according to the best natural Philosophers, adorned with Copper Plates:*] And have humbly besought Us to grant them Our Royal Privilege and Licence for the sole Printing and Publishing thereof for the Term of Fourteen Years; We being willing to give all due Encouragement to so useful a Work, are graciously pleased to condescend to their Request; and do therefore, by these Presents, so far as may be agreeable to Law, grant unto them, the said PHILIP MILLER and CHARLES RIVINGTON, their Executors, Administrators, and Assigns, Our Licence for the sole Printing and Publishing the said Book for the Term of Fourteen Years, to be computed from the Date hereof; strictly forbidding all our Subjects within our Kingdoms and Dominions to Reprint or Abridge the same, either in the like or any other Volume or Volumes whatsoever, or to import, buy, vend, utter, or distribute any Copies thereof reprinted beyond the Seas, during the aforesaid Term of Fourteen Years, without the Consent or Approbation of the said PHILIP MILLER and CHARLES RIVINGTON, their Heirs, Executors, and Assigns, under their Hands and Seals first had and obtained, as they will answer the contrary at their Perils: Whereof the Commissioners, and other Officers of Our Customs, and the Master, Warden, and Company of Stationers, are to take Notice that Obedience be rendred to Our Pleasure herein declared.

Given at Our Court at St. James's the Fourteenth Day of December, 1732.
in the Sixth Year of Our Reign.

By His MAJESTY's Command.

HARRINGTON.

THE
Gardeners Dictionary:

Containing the METHODS of
CULTIVATING *and* IMPROVING
THE
Kitchen, Fruit *and* Flower Garden,
AS ALSO, THE
Physick Garden, Wilderness, Conservatory,
AND
VINEYARD;

According to the PRACTICE of the
Most *Experienc'd* Gardeners of the *Present Age*.

Interspers'd with

The History of the PLANTS, the Characters of each GENUS, and the Names of all the particular SPECIES, in *Latin and English*; and an Explanation of all the TERMS used in BOTANY and GARDENING.

Together with

Accounts of the Nature and Use of *Barometers, Thermometers, and Hygrometers*, proper for GARDENERS; And of the Origin, Causes, and Nature of METEORS, and the particular Influences of *Air, Earth, Fire and Water* upon *Vegetation*, according to the best NATURAL PHILOSOPHERS.

Adorn'd with COPPER PLATES.

By PHILIP MILLER, Gardener to the Worshipful Company of APOTHECARIES, at their *Botanick Garden* at *Chelsea*, and F.R.S.

—*Digna manet divini gloria ruris.*

VIRG. GEO.

The SECOND EDITION, Corrected.

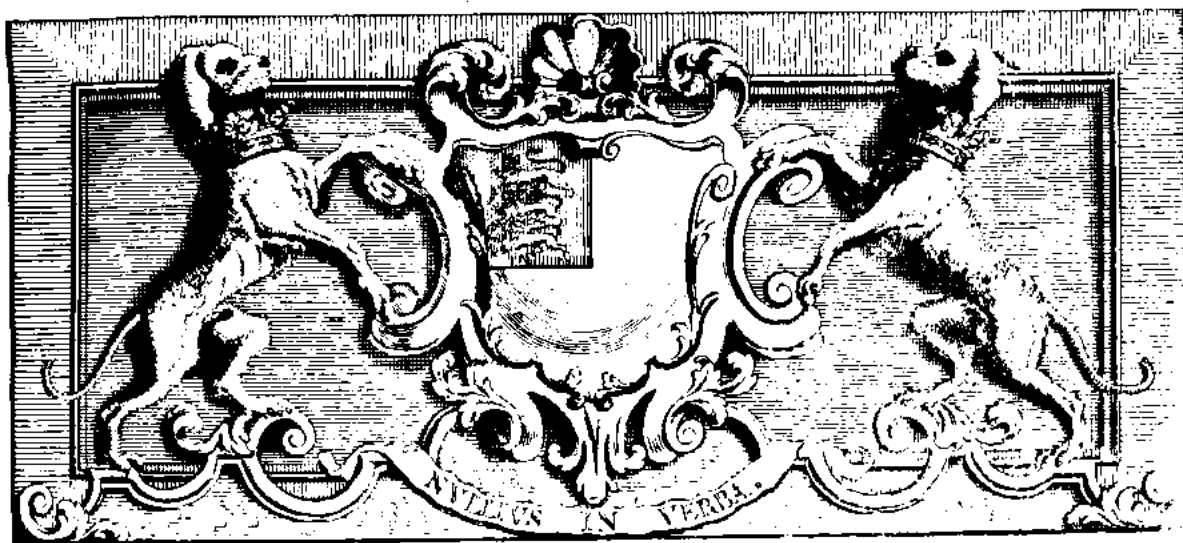
L O N D O N:

Printed for the AUTHOR;

And Sold by C. RIVINGTON, at the *Bible and Crown* in *St. Paul's Church-Yard*.

M. DCC. XXXIII.

Jos. Banks



TO
Sir *HANS SLOANE*, Bart.
PRESIDENT,
AND, TO THE
Council *and* Fellows
OF THE
Royal Society of. *LONDON*,
FOR
Improving Natural Knowledge;
THIS
GARDENERS DICTIONARY

Is Humbly Dedicated by

Their most Obedient Servant,

Philip Miller.



T H E P R E F A C E.



ARDENING is an Exercise excellently adapted to human Nature, and accordingly the Great Author of all Things, having planted a Garden, placed our first Parents therein to Till and Dress it.

THIS was called *The Garden of Eden*, i.e. *The Garden of Pleasure*; probably, not only on account of its pleasant Situation, but also because of the pleasurable Employment of Dressing and Keeping it.

WITH so many happy Circumstances is the Exercise of *Gardening* attended, that greater Encomiums can scarcely be given to any other: But of them all, I shall only mention, and that briefly, these following:

- | | | |
|--|--|--|
| 1. The <i>Delightfulness</i> ,
2. The <i>Innocency</i> ,
3. The <i>Healthfulness</i> , | | 4. The <i>Advantageousness</i> ;
And,
5. The <i>Honourableness</i> . |
|--|--|--|

1. As to the first, What can be more *delightful*, than in the *Spring-time*, to behold the Infant Plants putting forth their verdant Heads, from the Bosom of their fostering Mother the Earth? In the *Summer Months*, the Flowers ting'd with a Variety of the most charming Dyes, seeming, as it were, to vie with each other, which shall most allure the Beholder's Eye with their splendid Gayety, and entertain the Nostrils with their enlivening Fragrancy? and in *Autumn*, to view the bending Boughs, as it were, submissively offering their delicious Fruit, and courting the Gatherer's Acceptance?

2. As for *Innocency*; Horticulture was by the All-wise Creator appointed to be the Employment of our first Parents in their innocent State,
b
and

and what Employment can be more harmless? No Cruelty is used in this Exercise, unless the destroying of noxious Vermin that prey upon and devour the blessed Products of the Earth, can merit that opprobrious Name. What though the skilful Pruner scarifies bark-bound Trees, and displaces the barren, useless, and too luxuriant Branches, that rob the healthful and more useful Parts of their due Nourishment? these Wounds cause no Sense of Pain to the tenderest Plants; they heal up without Dressing or Bandage, and are thereby reduced to a more regular Beauty, a more healthful Constitution, and to a greater Fertility.

3. IT is *Healthful*. It is true, since the Fall of our Progenitors, the Work is not so easy as before it was; the Curse having covered the Ground with *Thorns* and *Briars*, and caused unprofitable Weeds to spring up among the useful Plants, to rob them of their proper Nourishment; so that the Ground which before, without Cultivation, would have been spontaneously obedient to vegetative Nature, must now, by the Sweat of the Brow, and no little Labour, be brought under Subjection: But then at the same time, to make amends, this very Labour is salutiferous: The Exercise of the Body prevents the Blood and Juices from stagnating and growing corrupt; and the Labourer is every Moment drawing in with his Breath a wholesome and enlivening Steam from the Earth, which heighten'd with the spicy Fragrancy of odoriferous Plants, causes the Blood and Spirits to circulate briskly; and together with the Motion of the Body, forces out and expels the morbid Parts through the Pores, which exhaling, leaves what remains more pure and uncontaminated. Besides, Labour sets an Edge to the Appetite, gives a more grateful and delicious Relish to the Products of the Earth, and at Night disposes the whole bodily Frame into a Capacity for the full Enjoyment of those refreshing Slumbers, that balmy Sleep, which generally forsakes the Downy Couches of the inactive, indolent Great.

4. THAT it is *advantageous*, no one will dispute, who sees, with what mighty Returns, even more than an hundred-fold, a diligent and skilful Culture repays the Labours of the sedulous Cultivator, producing an innocent and wholesome Food, that bountifully supplies to himself all the Necessaries of Life, and administers to all around him, of what Condition or Quality soever, sufficient to adorn the Table, and serve for Use and Elegance.

5. The Exercise is *Honourable*. For had it not the Great God himself for its first Artist, who not only laid out the Plan of the *Garden of Eden*, but is also said to have planted it with a vast Variety of the most beautiful Trees, Plants, and Flowers? and the Cultivating of it was appointed to be the Business of the sole Monarch and Lord of this terrestrial Globe, by his Creator, who in his great Wisdom found no Occupation so suitable as this, to that Innocence and Perfection of Nature in which he had form'd the first Man; who before the Fall, could enjoy no Earthly Delight equal to a Garden exquisitely adorn'd with Trees and Plants, every where embellish'd with beautiful Flowers, and shining with grateful Fruits, abounding with wholesome Springs and crystal Rivers, echoing with the melodious Harmony of the winged Choristers, and crown'd with a temperate Air, and a charming Vicissitude of kindly Seasons.

THIS

3

THIS Art has also had in all Ages, and in all Parts of the World, some of the greatest Princes, the wisest Sages, the chief Politicians, and bravest Warriors, as well as the more humble Vulgar, for its Admirers; among whom, none have more honoured this Art than *Cyrus* King of *Persia*, who was not only curious but skilful in it to Admiration. *Xenophon* relates the following Story of him.

“ *CYRUS* was so delighted with Gardens, that to what Region soever he came, or where-ever he made himself Master of a Place, he studiously encourag’d the Planting of Gardens, with all Things serving for Delight or Use, that the Soil was capable of producing; and when the Season of the Year permitted, was wont to hold Conversation in a Garden, where-ever he was.

“ If he observed that any of his Governors of Provinces took Care to cultivate the Land, and keep it well furnished with Trees and Fruits, according to the Nature of the particular Soil, to them he gave other Territories, and enrich’d them with Gifts, and conferr’d greater Honours upon them. But as for those who suffer’d their Land to lie uncultivated, either through Neglect, or any other Cause, he fined them, depos’d them from their Magistracy, and substituted others in their Places.

“ On a certain Time this great Prince, as a Token of his Benevolence, introduced his Guest *Lysander* into his elegant Garden at *Sardis*: *Lysander* having survey’d the Garden with great Exactness, was at a Loss which most to admire, the great Variety of the Flowers and Fruit, or the elegant Disposition both of them and of the Trees, which being planted in an exquisite Quincunx Order, entertained them every Way as they walk’d, with their most fragrant Odours and beautiful Fruits; and after some time, breaking Silence, declar’d, That he was greatly delighted with what he saw, but that he could not help admiring, much more, the Artist who dispos’d the Plants and Flowers in that beautiful Order, than the Things themselves: To which *Cyrus*, greatly pleas’d, reply’d, O *Lysander*, all this was done by my own Hands, and many of those Trees which you now behold, I myself have rais’d from Seed. *Lysander* was astonish’d to hear this, and expressing his Surprise to the King; *Cyrus* said, Do you wonder at this, *Lysander*? I swear, by the Diadem I wear, that if I am in Health, I never eat any Food before I have exercis’d my Body ’till I sweat, sometimes in Martial Exercises, at other times in Gardening, or other laborious Exercises of Husbandry.”

LAERTES the Father of *Ulysses*, was accurate and diligent, and that even in his old Age, in furnishing his Orchard and Garden, and taking Care of the Utensils proper to the latter, as we find in *Homer*, who taking Notice of *Ulysses* being about to pay a Visit to *Laertes*, says, He look’d for him no where but in his Garden, where he found him attended with his Servants, gathering of Shrubs to make an Hedge, and the old Man directing them; and weeding the Plants with Gloves on, because of the Bushes.

WE have likewise many of the famous Gardens of the Ancients elegantly describ’d by the Poets and Historians; as the Pensile ones of *Semiramis*, those magnificent ones of King *Solomon*, the *Hesperian*, with those of *Adonis* and *Alcinous*, the latter of which describ’d by *Homer*, and beautifully

tifully translated into *English* by Mr. Pope, I shall take the Liberty to transcribe.

*Close to the Gates a spacious Garden lies,
From Storms defended and inclement Skies:
Four Acres was th' allotted Space of Ground,
Fenc'd with a green Enclosure all around.
Tall thriving Trees confess'd the fruitful Mould;
The redd'ning Apple ripens here to Gold:
Here the blue Fig with luscious Juice o'erflows;
With deeper Red the full Pomegranate glows.
The Branch here bends beneath the weighty Pear,
And verdant Olives flourish round the Year.
The balmy Spirit of the Western Gale
Eternal breathes on Fruits untaught to fail:
Each dropping Pear a following Pear supplies,
On Apples Apples, Figs on Figs arise;
The same mild Season gives the Blooms to blow,
The Buds to harden, and the Fruits to grow.
Here order'd Vines in equal Ranks appear,
With all th' united Labours of the Year.
Some to unload the fertile Branches run;
Some dry the black'ning Clusters in the Sun:
Others to tread the liquid Harvest join,
The groaning Presses foam with Floods of Wine.
Here are the Vines in early Flow'r descry'd,
Here Grapes discolour'd on the Sunny Side,
And there in Autumn's richest Purple dy'd.
Beds of all various Herbs, for ever green,
In beauteous Order terminate the Scene.*

*Two plenteous Fountains the whole Prospect crown'd;
This thro' the Gardens leads its Streams around,
Visits each Plant, and waters all the Ground:
While that in Pipes beneath the Palace flows,
And thence its Current on the Town bestows;
To various Use their various Streams they bring,
The People one, and one supplies the King.*

SIR WILLIAM TEMPLE has remarked, that this Description contains all the justest Rules and Provisions which can go toward composing the best Gardens. Its Extent was four Acres, which in those Times of Simplicity was looked upon as a large one, even for a Prince: It was inclos'd all round for Defence; and for Conveniency, joined close to the Gates of the Palace.

HE mentions next the Trees, which were Standards, and suffer'd to grow to their full Height. The fine Description of the Fruits that never fail'd, and the eternal Zephyrs, is only a more noble Poetical Way of expressing the continual Succession of one Fruit to another, throughout the Year.

THE Vineyard seems to have been a Plantation distinct from the Garden; as also the Beds of Greens mentioned afterwards at the Extremity of the Inclosure, in the Nature and usual Place of a Kitchen-Garden.

THE two Fountains are dispos'd very remarkably. They rose within the Inclosure, and were brought by Conduits or Ducts, one of them to water all the Parts of the Garden, and the other underneath the Palace into the Town, for the Service of the Publick.

NOR was *Gardening* less regarded by the *Romans*, who, after they had extended their Conquests in the *East*, were careful to observe the Methods used by the *Grecians*, in cultivating the Ground; which was an Exercise better adapted to the Genius of those People (who had been inured to bodily Labour and Fatigue, during the long Continuance of their Wars), than many of the more polite Employments of the *Greeks*. And when the *Romans* had transplanted this Art into their own Country, they were no less diligent to improve it; as may be seen by the Writings of *Cato*, *Varro*, *Columella*, and *Pliny*, with many others, who have condescended to write upon this humble Subject, for the Instruction of others. But had *Virgil* favour'd the World with as compleat a Poem on Horticulture, as he has done upon Agriculture, it would have been of great Service to the Promotion of it. But this, he says, he left to other Hands, and has only, as it were, by Accident, mention'd Gardens in his Writings.

AMONGST the Moderns we find the greatest Princes have always been very solicitous in adorning their Palaces with magnificent Gardens, which they usually chose for their principal Retreat and Divertisement, from the Fatigue of their other Employments. And it has been justly observed, that according to the Progress of Learning, in the different Parts and Ages of the World, there *Gardening* has proportionably flourished.

BUT it is very lately that the truly magnificent Taste in *Gardening* has flourish'd in these Northern Parts of *Europe*; for although in King CHARLES the Second's Reign, there was a great Spirit amongst the Nobility and Gentry of *England*, for *Planting* and *Gardening*, which Spirit was greatly heighten'd in King WILLIAM's Reign, during which Time most of the large Gardens in *England* were laid out and planted; yet we find the Taste at that Time extended little farther than to small Pieces of Box-work, Finish'd Parterres, and Clipp'd Greens, all which are now generally banish'd out of the Gardens of the most polite Persons of this Age, who justly prefer the more extended Rural Designs of Gardens, which approach the nearest to Nature.

INDEED we are greatly oblig'd to many curious Persons of the last Age, for their many useful Experiments on Vegetation, which have been of great Service to promote the more skilful Management of the various Sorts of Trees, Plants, and Flowers. But to none is *England* more indebted, than to the Learned Mr. *Hales* of *Teddington*, for his large Discoveries made in the Vegetable Kingdom, whereby many mistaken Notions concerning the Motion of the Sap in Plants, &c. are set in a clear Light; and it is to this indefatigable Gentleman, that I am greatly indebted, for many valuable Things in the following Treatise.

BUT lest I should lengthen out this Preface beyond its intended Size, I shall return to give some Account of the following Work: And here it may be necessary to make an Apology for adding to the Number of the Books on this Subject, which of late Years has very much increas'd, so that many Persons have thought it needless to write any thing more on the Science; but how well soever the several Authors who have gone before me, have acquitted themselves in the different Branches of this Art, yet, as the several Rules are scatter'd about in many Volumes, it must be allow'd a necessary Work, to reduce them into one single Volume, in a methodical Order, whereby a Person may readily turn to any particular Article, of which he wants to be inform'd, without being at the Trouble of turning over several Books, to find proper Instructions for the Management of a Tree, Plant, or Flower; and perhaps when he has consulted the several Authors who have wrote upon the same Plant, scarce any two of them have agreed in their Directions; so that if a Person is not as well skilled in the Art as his Author, he will be at a Loss which of their Instructions to follow, and if he be equally skill'd, he can want none of their Directions.

ANOTHER Disadvantage, which attends most of the Books of *Gardening* that I have read, is, their being wrote rather to amuse such as already have a competent Knowledge in the Art, than to inform the Ignorant; scarce any of them condescending to write of the manual Operation, which must be first known before a Person can proceed rightly in the Management of any Part of *Gardening*; for to what Purpose is it, to a Person who wants to know the exact Method of propagating any particular Plant, to read over a fine Theory of *Gardening*, without ever entering into the necessary Instructions how he must proceed: And this is too often the Fault in many Books on this Subject; most of which have been wrote by Persons only skilful in the *Theory*, and therefore can't be suppos'd capable of instructing others in the *Practice*, that being what they themselves are unacquainted with.

NOR have many of the modern Writers on *Gardening* succeeded much better in their *Theories*, most of them relying upon the Authority of those who have wrote before them on the same Subject, very few of them having ever made Trial of the Experiments which they have recommended, and upon which their Hypotheses are built: For how much soever some of them have promis'd in their Title Pages, yet when their Works are narrowly examin'd, it will appear, that some of the most popular Authors have done little more than changed the Language, or artfully transposed the Sense of those who wrote long before them, without taking the least Notice to whom they were indebted for their Works; and yet these same Persons are continually charging others with stealing from them, whereas if they were to render back all that they have artfully purloin'd from other Books, they would have little of their own to lose: How these Persons came to have a Right thus to treat every Person (who fairly acknowledges from whence he has taken an Article) as a Plagiary, I can't imagine; when they have not only transcrib'd many Pages together, but also taken Draughts and Schemes from others, and boldly inserted them for their own, though they have been so religiously exact in copying from their

Predecessors

Predecessors in this Science, that they have seldom fail'd at the same time to transcribe their Blunders as well as their Beauties, and have thereby manifested, how unable the assumed Skin of the Lyon, has been to conceal those Ears, which are the peculiar Diagnostic of a much more servile and ignoble Creature.

HOWEVER, lest I should be charg'd with having been guilty of the same Practice I am now condemning in others, I have this to say in my own Defence, That where I have borrowed any thing from the Works of the most reputed Philosophers of the present Age, I have generally acknowledged whence I had it, which I hope will not be deem'd a Crime. But this has been principally with regard to the Theory relating to Meteors, &c. on which Heads, it would have been a Presumption, were I capable, to offer any thing of my own. For in the Directions laid down for the Management of all the various Plants herein-mention'd, there is little said but from my own Experience, or from that of some other particular Friends. And here I can say what few who have written before me on this Subject could do, *viz.* That there are very few Plants (out of the great Number herein-mentioned) which I have not cultivated; and the Instructions given for their Propagation, &c. are such as have succeeded best with me.

THE Method pursued through the following Work, is such as may be hoped will please the Judicious: For, first I have ranged all the Things in an Alphabetical Order, so that a Person need only turn to the Initial Letter of the particular Plant, &c. of which he wants to be inform'd, where he will find it particularly treated of. In doing of this, I chose rather to range the Plants under their proper *Latin* Names, which are better ascertained than the *English*, and more generally known: But in order to render it easy to those who were not acquainted with the *Latin* Names, I have generally inserted the several *English* Names, in their Order of the Alphabet, referring to the *Latin*, under which they are treated; and have also added an *Index* of the several Names by which each Plant is known, in which the Name is refer'd to, where it may be found.

AFTER mentioning the *Genus*, I have added the *Etymology* thereof; and next have set down the distinguishing *Characters* by which each Plant is known, whereby a Person who will attend to the several Characteristicks, need not be at a Loss where to refer a Plant he may not be well acquainted with: Then I have inserted most of the particular *Species* which are cultivated in *England*, either for Use or Beauty, with the best Methods for Propagating and Improving them; and the different Soils, Situations, and Degrees of Heat, in which each Plant is found to thrive. To this I have added, their several Growths, with the proper Distance which each should be allowed, whereby a Person may easily judge how to place 'em to the best Advantage in a Garden; and the various Uses of them, whether for Meat or Medicine, or for the Beauty of their Flowers, &c. in adorning the Parts near a Habitation: In all which I have not asserted any thing upon Trust, nor copied from many idle Authors who have written on this Subject; but such as I have experienc'd myself, or have received from Persons of undoubted Authority. And whatever Errors or Mistakes may have crept into this Work, I shall be very ready to expunge them, upon Information,

Information, and gratefully acknowledge the Favour, whenever any judicious Person shall favour me with such Remarks.

INDEED a Work of this kind would employ the Joint-Labours of many skilful Persons, to render it perfect, were it possible to find a Set of Men of equal Integrity, Openness, Industry, and Judgment, to undertake it, which I fear is rarely to be met with in any Society of Men: All that I have to hope is, that as I have employed my best Talents in this Work, and delivered myself with unreserved Freedom and Openness, it may atone for any Faults in Style, or Slips of the Pen.

BUT as the Plan here laid down is capable of great Improvement, so I purpose to employ all my leisure Hours thereon, and shall diligently compare, correct, and amend whatever shall appear amiss, and add whatever new Observations and Experiments I shall hereafter make, in the Course of my Practice: And to this End I invite all such Persons as have made any new Experiments in relation to this Art, which they are willing to communicate, to send them directed for me at the *Physick-Garden, Chelsea*, which I shall thankfully receive, and gratefully acknowledge. And since it is more than probable that Time may produce many Things new on this Subject, and that the Inserting of them in another Edition of this Book, would be an Injury done to the Encouragers of the present Performance, I therefore take upon me to promise, that whatever Alterations or Additions I shall make hereto, shall be published separately, for such as shall purchase the present Volume.

THE annual Increase of new Plants, Fruits, and Flowers, will occasion some Alteration in the Book, in the Compass of a few Years; for as new Things are obtain'd from abroad, so the old ones of less Value are turn'd out of the Gardens, to make Room for them, which has been sometimes practis'd to a great Fault; many Persons being too fond of Novelties, have often turn'd out good Fruits to make Room for bad ones; therefore I would advise every one to make Trial of such new Fruits, before they propagate them in Plenty, and not take their Characters upon Trust; and especially to be careful how they are impos'd on by the New Names often given to Fruits, by Persons of small Skill, who, if they happen to meet with a Fruit with which they are not acquainted, presently impose a Name of their own upon it, which has occasion'd the present Confusion of Names, by which one and the same Sort of Fruit is called, in different Places, to the great Discouragement of curious Persons: In order to remedy which, I have taken no small Pains to examine and compare the several Sorts of Fruit, with the Descriptions given in all the best Authors, and have added as many of the Names to each Kind, as I could find they were differently known by; to which I have subjoin'd a short Description with their Times of Ripening, and the particular Stocks upon which each Sort succeeds best, which, I hope, will be of no small Service to the Curious in that Way.

NOR is the Confusion of Names to the same Sort of Fruit peculiar to *England*; for in *France* (which is the greatest Fruit Country in *Europe*) there is a great Disorder, scarce any two Provinces calling a Fruit by the same Name; so that those Trees which are brought from thence, are not more to be depended upon, than such as are procured from the meanest Nurseries

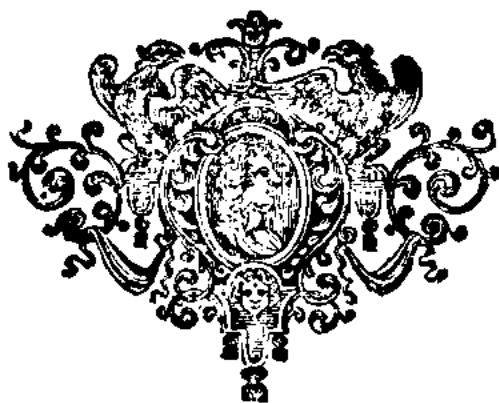
Nurseries in England. And this Perplexity in the Names of Fruit being so great, has put some curious Gentlemen at *Paris*, upon composing a General Treatise of Fruit-Trees, in which they design to exhibit on Copper Plates, all the several Kinds of Fruit, drawn from the Fruits themselves, and well engraven (some of which Plates were communicated to me two Years ago). Such a Work as this, if well executed, will be of great Use to ascertain the Kinds of Fruit; but by the Model laid down by those Gentlemen, I fear it will not have the desired Success. For as these Fruits are only printed in Black and White, it will be very difficult to distinguish the Kinds thereby: And as they allow a *Folio* Plate to each Sort, so it must render the Book too dear, to be purchas'd by any but Persons of great Fortune, and the Prolixity they abound with, in mentioning the various medicinal Qualities of each Fruit, will render the Work too tedious for most *English* Readers.

BUT were a Work of this Kind carefully done by some judicious Persons, with the Fruits exhibited in their proper Colours, and concise Descriptions, with their Culture, added to them, it would be a valuable Performance. In order to which, a *Society of Gardeners* did engage therein some few Years past, and had a great Variety of the most valuable Fruits and Flowers painted by an excellent Hand, ready to be engraven, and have since published a Catalogue of Hardy Trees and Shrubs, in the Preface to which they have given a particular Account of their Undertaking, with their design'd Method of prosecuting it, if they meet with proper Encouragement. In this first Part which they have publish'd, are inserted the various Names given to each Tree (by the best Writers on *Botany*) with the common *English* Name subjoin'd, which will be found very useful to Gentlemen, in knowing what to write for to the Nursery-Man, so as to be understood.

The Introduction of many useful Forest-Trees, from the Northern Parts of *America* annually, will also furnish Materials for farther Additions, as their Natures, Uses, &c. become known to us; and this is a Part of *Gardening* well worth Encouragement, since hereby a great Number of useful and beautiful Trees may be added to our Wildernesses and other Plantations. But here I must caution People not to be too forward in propagating foreign Trees in large Quantities, for the Sake of Timber, before they are fully persuaded of their Worth; which may, instead of being serviceable, prove greatly detrimental to the Nation, by neglecting to cultivate our own approved Timber Trees, for the Sake of others of foreign Growth, whose Timber is of little Value: An Instance of this we have at present in the *Scarlet Oak*, a great Number of whose Acorns have been this Season imported, and sold at a large Price, with great Assurances of their quick Growth, and of the Value of the Timber, which hath engaged many curious Persons to sow them; but if they cultivate these Trees in any Place, except in Gardens, or Plantations near Habitations, for Shade (for which Purpose they are very proper, being of quick Growth), they will find themselves deceived, the Timber being by no means comparable to our *English Oak*: However, many other Sorts of Trees there are in *America* (particularly of the *Fir* Kind) which would

be very ornamental to our Plantations, and their Timber very useful for many Purposes, were they once introduced amongst us.

WHILE I am upon this Subject, it will be necessary to take Notice of an Error too commonly committed, in the placing the various Sorts of Trees in Gardens, which is by surrounding the Quarters of Wildernesses with tall, clipp'd Hedges, whereby the Trees are secluded from the Sight of Persons in the Walks, and the Expence in sheering these Hedges is no small Matter, in large Gardens, where they commonly abound. This I have particularly taken Notice of under the Article of *Wildernesses*. As to Designs for Gardens, it would be only adding to the Expence of the Book, by Engraving a great Number of Plates, when it will be impossible to lay down Plans, which may be serviceable to any one particular Design, because these must be varied according to the Situation, and Conveniencies of the Place: I have therefore only just mention'd the Particulars which should be observed in laying out *Gardens*, leaving the other Parts to be supplied by those who have the Direction of this Business.



AN EXPLANATION of the AUTHORS NAMES and WORKS, referr'd to by the Abbreviations in this WORK.

ALDIN. *A Description of some rare Plants which were cultivated in the Farnesian Gardens at Rome, by Tobias Aldinus. Printed at Rome 1625. Fol.*

Banister. *A Catalogue of Plants observed in Virginia by John Banister. Printed in Ray's History of Plants.*

Bocc. Rar. *Figures and Descriptions of rare Plants observed by Paul Boccone in Sicily, &c. Printed at Oxford 1674. in 4to.*

Boerh. Ind. *An Index of the Plants growing in the Physick-Garden at Leyden, by Doctor Herman Boerhaave. Printed at Leyden 1719. in 4to.*

Breyn. Cent. I. *The first Century of Exotick Plants by Dr. James Breynius. Printed at Dantzick 1678. Fol.*

Breyn. Prod. I & II. *The first and second Prodromus to the Collection of rare Plants, by Dr. James Breynius. The first printed 1680. the second 1689. at Dantzick, in 4to.*

Cæsalp. *Andrew Cæsalpinus of Plants. Printed at Florence 1583. in 4to.*

C. B. P. *Caspar Bauhinus's Pinax to his Theatre of Plants. Printed at Basil 1671. in 4to.*

C. B. Prod. *Caspar Bauhinus's Prodromus to his Theatre of Plants. Printed at Basil 1671. in 4to.*

Clus. *Charles Clusius's History of rare Plants. Printed at Antwerp 1601. Fol.*

Clus. Exot. *Charles Clusius's Exoticks, in Ten Books. Printed at Antwerp 1605. Fol.*

Commel. Rar. *Descriptions and Figures of rare Exotick Plants, which were in the Physick-Garden at Amsterdam, by Caspar Commelin. Printed at Leyden 1706. in 4to.*

Commel. Præl. *Caspar Commelin's Prelude to Botany. Printed at Leyden 1703. in 4to.*

Corn. *James Cornutus's History of Canada Plants. Printed at Paris 1635. in 4to.*

Dod. *Dodonæus's Six Pemptades. Printed at Antwerp 1616. Fol.*

Ferrar. Hesp. *John Baptist Ferrarius's Hesperides. Printed at Rome 1646. Fol.*

Ferrar. Fl. Cult. *The Culture of Flowers, by John Baptist Ferrarius. Printed at Rome 1633. in 4to.*

Ger. Emac. *Gerard's History of Plants, improved by Thomas Johnston. Printed at London 1633. Fol.*

Hort. Amst. *The History of rare Plants which were in the Physick-Garden at Amsterdam, by Caspar and John Commelin, in two Volumes Folio. Printed at Amsterdam 1697 and 1701.*

H. Beaum. *A Catalogue of the Exotick Plants which were in the Gardens of Mynbeer Van Beaumont in Holland. Printed at the Hague 1690. 8vo.*

H. Eyft. *Hortus Eystettenfis, by Basilius Besler. Printed at Norimberg 1613. Fol.*

H. C. *Hortus Catholicus, i. e. the Universal Garden, by Franciscus Cupani. Printed at Naples 1696. in 4to.*

H. L. *A Catalogue of the Plants growing in the Physick-Garden at Leyden, by Paul Herman, M. D. Printed at Leyden 1687. in 8vo.*

H. R. Monsp. *A Catalogue of the Plants growing in the Royal Garden at Montpellier, by Peter Magniol. Printed at Montpellier 1697. in 8vo.*

H. R. Par. *A Catalogue of the Plants growing in the Royal Garden at Paris. Printed at Paris 1665. in Fol.*

H. Edin:

- H. Edin. *A Catalogue of the Plants growing in the Physick-Garden at Edinburgh*, by James Sutherland. Printed at Edinburgh 1683. in 8vo.
- J. B. *A Universal History of Plants*, by John Bauhin, in three Volumes. Printed at Embrun 1650. in Fol.
- Lob. Ic. *Icons of Plants* by Matthias Lobel. Printed at Antwerp 1576. in Fol.
- Lugd. *A General History of Plants* by Dalechamp. Printed at Lyons 1586. Two Volumes in Folio.
- Malp. *The Anatomy of Plants*, by Marcellus Malpighius. Printed at London in Fol.
- Mor. Hist. *A Universal History of Plants* by Robert Morison. Printed at Oxford 1679, 1680, and 1699. Three Volumes in Folio.
- Munt. Aloid. *A History of Aloes*, by Abraham Muntingius. Printed at Amsterdam 1668. in 4to.
- Par. Bat. *Paradisus Batavus, i. e. Batavian Paradise*, by Paul Herman, Professor of Botany at Leyden. Printed at Leyden 1698. in 4to.
- Par. Bat. Prod. *The Prodromus to the Paradisus Batavus*.
- Park. Parad. *The Garden of pleasant Flowers*, by John Parkinson. Printed at London 1629. in Fol.
- Park. Theat. *The Theatre of Plants*, by John Parkinson. Printed at London 1640. in Fol.
- Pluk. Alm. *Almagestum Botanicum*, by Leonard Pluknet. Printed at London 1696. in Fol.
- Pluk. Amal. *Amaltheum Botanicum*, by Leonard Pluknet. Printed at London 1703. in Fol.
- Pluk. Mantiss. *Mantissa Almagesti Botanici*, by Leonard Pluknet. Printed at London 1700. in Fol.
- Pluk. Phyt. Pluknet's Phytographia, i. e. a Delineation of Plants. Printed at London 1691, and 1692. in Fol.
- Plum. N. G. *New Genus's of American Plants*, by Father Plumier. Printed at Paris 1713. in 4to.
- Plum. Pl. Am. *A Description of American Plants*, by Father Plumier. Printed at Paris 1693. in Fol.
- Raii Hist. *Ray's History of Plants*. Printed at London 1686, and 1704. in Three Volumes Fol.
- Raii Syn. *A Synopsis of the British Plants*, by John Ray, augmented by Dr. Dillenius. Printed at London 1724. in 8vo.
- Rea. Flora, Ceres, and Pomona, by John Rea. Printed at London 1676. in Fol.
- Sloan. Cat. *A Catalogue of the Plants growing in the Island of Jamaica*, by Dr. Hans Sloane. Printed at London 1696. in 8vo.
- Sloan. Hist. *A Natural History of Jamaica*, by Dr. Hans Sloane. Printed at London 1707, and 1725. in Two Volumes in Folio.
- Swert. *A Florilegium, or a Collection of Flowers* by Swertius. Printed at Frankfort 1612. in Fol.
- Tab. Ic. *Icons of Plants* by Tabernæmontanus. Printed at Frankfort 1550. in Fol.
- Tourn. *Institutions of Botany*, by Joseph Pitton Tournefort. Printed at Paris 1716. in 4to.
- T. Cor. *A Corollary to the Institutions of Botany*, by Joseph Pitton Tournefort. Printed at Paris 1703. in 4to.
- Volk. *Flora Norimbergensis, i. e. Flora of Nuremberg*, by Dr. Volkamer. Printed at Nuremberg 1700. in 4to.
- Zan. *A History of Plants*, by Jacob Zanoni. Printed at Bologna 1675. in Fol.





THE Gardeners Dictionary.

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BELE Tree. *Vide* Populus.

ABIES; The Firr Tree.

The Name is derived of *Abco*, because it advances much in Height; and for the same Reason it is by the Greeks called Ἐλατη of ἰλάνω *promveo*, i. e. to extend in Height; or, as others say, of *Abco*, to go away, because the Bark goes away, or is broken off easily.

The Characters of this Tree are,

It is ever-green; the Leaves are single, and for the most part produced on every Side the Branches; the Male Flowers (or Catkins) are placed at remote Distances from the Fruit on the same Tree; the Seeds are produced in Cones, which are squamose.

The Species of this Tree, which are at present to be found in the English Gardens, are,

1. ABIES; *Taxi folio*; *fructu sursum spectante*. *Tourn.* The Silver or Yew-leaved Firr Tree.

2. ABIES; *Tenuiori folio*; *fructu deorsum inflexo*. *Tourn.* The Common Firr or Pitch Tree; sometimes called, The Norway or Spruce Firr.

3. ABIES; *Minor*; *peñtinatis foliis*; *Virginiana*; *conis parvis subrotundis*. *Pluk. Alm.* The Virginian Firr Tree, with small roundish Cones.

4. ABIES; *Taxi folio*; *fructu longissimo, deorsum inflexo*. The Yew-leav'd Firr Tree, with long hanging Cones, commonly called, The Long-con'd Cornish Firr.

5. ABIES; *Piceæ foliis brevibus*; *conis minimis*. *Rand.* The Pitch-leav'd Firr Tree, with small Cones.

6. ABIES; *Piceæ foliis brevioribus*; *conis parvis, biuncialibus laxis*. *Rand.* The shortest Pitch-leav'd Firr Tree, with loose Cones.

7. ABIES; *Taxi foliis*; *odora Balsami Gileadensis*. *Raii. Hist. App.* The Balm of Gilead Firr. *Vulgô.*

8. ABIES; *Taxi folio*; *fructu rotundior*; *obtusis*. The Yew-leav'd Firr Tree, with round Cones, by some called, The Balm of Gilead Firr.

The first and second Sorts of Firrs are very common in most Gardens, and Plantations of ever-Green Trees; and the second Sort is very common in the Woods of Norway, and is the Tree that affords the white Deals.

These Trees were (not many Years since) much esteemed for Ornaments in ever-green Gardens; but the Leaves and lower Branches decaying, and soon falling off, so as to render the under Part of the Tree bald and unsightly, together with their destroying every thing that grows under them, they are not at present in so much Request.

The third Sort Dr. *Plukenet* mentions to have been formerly growing in the Bishop of London's Garden at Fulham, but hath been since destroyed, and hath been retrieved again from Seeds sent from New-England by Mr. Moore, which were sown by Mr. Fairchild of Hoxton, who raised several Plants from them, and finds it hardy enough to resist our severest Cold in the open Ground.

The fourth Sort was brought, many Years since, from America, and was planted in Devonshire, where are now large Trees of this kind, which annually produce ripe Seeds, from whence the Gardens near London have been supplied. This Tree grows to be very large, and makes a beautiful Figure, the under Part of the Leaves being of a whitish, and the upper

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Part of a glaucous or Sea-green Colour, and are closely set upon the Branches. This Tree is also very hardy.

The fifth and sixth Sorts were also brought from *America*, and planted in *Devonshire* and *Cornwall*, and are, by the Inhabitants of those Countries, used to make Spruce Beer, and are by them called the *Spruce Firrs*; but since any of these Sorts may be used for the same Purpose, this Appellation doth no more belong to these than any other of the Kinds.

These Trees grow much closer and thicker than the *Common Firr*; nor are their Branches and Leaves so apt to decay and fall off, which renders them more valuable.

The seventh and eighth Sorts are promiscuously called, *The Balm of Gilead Firrs*, but they are very distinct, according to the Branches which I had sent me from *Devonshire* and *Cornwall*. The seventh Sort Mr. Ray mentions in the Supplement to his *History of Plants*, as growing in the Duke of *Beaufort's* Gardens at *Badmington*. It was also in the Bishop of *London's* Garden at *Fulham*, some Years since. This Sort produces long Cones, which are sharp pointed, and stand erect upon the Branches, emitting a large Quantity of a resinous Matter: the Branches grow flat, and the Leaves are very short.

The other Sort produces Cones somewhat like those of the Cedar of *Libanus*; the Leaves are of a darker Green, and are produced thicker on every Side of their Branches, so that it is one of the beautifullest Trees of all the *Firr* kind.

The Leaves of these two Trees being bruised between the Fingers, emit a very strong Balsamick Smell, which hath given Occasion to some to believe, that the *Balm of Gilead* was an Exudation from one of these Trees, from whence they received their Names; but this is known to be a Mistake, that curious Balsam being the Production of a Tree very different from this Class.

The various Uses of these Trees, either in Medicine, or for mechanical Uses, are too many to be here enumerated, but whoever hath a mind to see these things at large, may turn to *John Baubin's History of Plants*, Vol. I. Page 221. or to *Ray's History of Plants*, where they will meet with an ample Account thereof.

Before I proceed to say any thing of the Culture of these Trees, I shall beg leave to add the Sorts of *Pines* to the *Firrs*, which altho' separated to a great Distance by the Alphabetical Order here followed, yet have a near Alliance, both in their classical Distribution, and also in their Culture; and are, by the Unskilful in Botany, frequently confounded together.

PINUS; The Pine Tree.

The Characters of this Tree are,

The Leaves are ever-green, longer than those of the Firr, and are produced by Pairs out of each Sheath or Covering.

The Species of this Tree, to be found in the *English* Gardens, are,

1. PINUS; *saliva*, C. B. Pin. 491. The manured Pine.

2. PINUS; *sylvestris*, C. B. Pin. 491. The Pinafter, or Wild Pine.

3. PINUS; *Americana*, *quinis ex uno folliculo setis, longis, tenuibus triquetris ad unum angulum, per totam longitudinem minutissimis crenis asperatis*, Pluk. *Amalib.* 171. This is commonly called Lord Weymouth's *Firr*, or Pine.

4. PINUS; *Americana*; *foliis prælongis subinde ternis; Conis plurimis confertim nascentibus*. Cat. Plant. Ang. The Cluster, or Large Bunch'd Pine.

5. PINUS; *sylvestris foliis brevibus glaucis, conis parvis albertibus*. Raii Syn. 2. 288. The Scotch Pine, commonly called Scotch *Firr*.

6. PINUS; *Americana, palustris*. The Swamp Pine. *Vulgô*.

The first, second, and fifth Sorts are very common in *England*, but the third and fourth are in very few Gardens. The third was raised several Years ago in the Duke of *Beaufort's* Gardens at *Badmington*, and is now growing in the Earl of *Pembroke's* Gardens, where it thrives very well, and is become a large Tree.

In the Year 1724, some fresh Seeds of this kind were sent over from *Carolina*, from which I raised some Plants in the *Physick* Garden, which, altho' but small, stand in the open Ground, and resist the Winter's Cold very well. The fourth Sort is now growing in the Bishop of *London's* Garden at *Fulham*, and is a very large Tree, producing ripe Cones almost every Year; from whence several young Trees have been raised by several Nursery Men near *London*. The Leaves of this Tree are commonly three, produced from each Sheath; and the Cones grow in great Clusters. On a Branch which was taken from the old Tree, I counted 39 Cones in one Bunch.

The sixth Sort is very proper to continue Plantations of these ever-green Trees, when it may so happen that a moist swampy Soil may intervene (as it many times doth) between rising Ground, and in which Part we could not carry either the Avenue or other Plantation on, with Trees of the same kind, all the other Sorts being, for the most Part, mountainous Plants; so that here is an Advantage which could not be other ways obtained, that should encourage Gentlemen to cultivate as many of the foreign Trees, as can be by any means naturalized to our Climate, tho' the Uses of them are not immediately known; for it is certain that Time will discover something, either for Use or Beauty, in most of them.

Beside these, Mr. Ray, in his valuable *History of Plants*, hath mentioned seven or eight other Species; but as there are at present scarcely any of them in *England* (and if they were brought hither by curious Persons, their Culture would nearly agree with those above mentioned; the only Difference to be observed, is to shelter such as come from warmer Climates for the two or three first Years, after which Time I am persuaded most of the resinous Trees will do well with

with us abroad ; therefore) I shall forbear mentioning any more Sorts, referring the curious Reader to the valuable Book before cited.

These Trees are all raised from seeds taken out of their polyspermous Cones. The way to get out the Seeds, is either by exposing the Cones to a gentle Fire, or by soaking them all Night in Water, which will cause their squamose Cells to open, and readily emit their Seeds; but this ought not to be done until you are ready to sow them, which is best perform'd in the Beginning of *March*.

The manner of sowing them (if for large Plantations) is as followeth; After your Ground hath been plow'd to loosen the Earth, and destroy the Weeds (especially if the Ground is subject to Heath or Furze) it must be plough'd two or three times, and the Roots carefully grubbed up the more effectually to destroy these spreading Plants, which would otherwise soon over run and spoil your young Plantation. This being done, you may with a Spade, level the Earth in small Spots at about every six Feet square: In which Spots you may sow ten or twelve Seeds, covering them about a quarter of an Inch thick with some of the same Mould broken fine, and the great Stones taken out (but not sifted, for Reasons hereafter mentioned) when this is done, it will be a good Way to lay upon each of these Spots some Peas Haulm, Furz, or any other light Covering, to prevent the rapacious Birds from destroying your young Plants just as they peep out of the Ground (they being very fond of the Husk or Coat of the Seed, which the young Plants bring up on their Heads); Which Covering will also prevent the drying Winds and Sun from piercing the Ground and destroying your Seed. This Covering may remain some time after the Plants are come up, provided it is not laid over thick, nor too close, which would thereby draw and weaken the Plants, by preventing the Ingress of the Air. When this Haulm or Covering is taken off, it will be necessary to draw a little loose Earth round the Stems of your young Plants, to strengthen them, as also to stick some Furze over them, to prevent the Sun from scorching them, which is very hurtful to these Plants while young. In each of these Spots (if your Seed was good) you may reasonably expect 6 or 8 Plants to come up, which may remain together until the third Year; but in the mean time it will be a very good Way to preserve your young Plants, to lay a little Litter, or some Mulch upon the Surface, and round the Stems of the Plants, to guard against severe Frost in Winter, and extreme Drought in Summer. This being carefully performed, will save the Trouble of Watering, and be more serviceable to your Plants.

The third Year after sowing, you may remove some of these Plants into another Plantation (which Ground ought to be prepar'd as before directed). The best Season for this Work is towards the latter End of *March*, and Beginning of *April*, the Weather mild, but not when the Easterly drying Winds blow, which presently dry the small Fibres of these Plants when out of the Ground. The Distance these Trees ought to be planed (if for a close Plantation) may be

about eight Feet square, which Distance will be found sufficient; for if they be planted at too great a Distance, they are subject to shoot out many lateral Branches, which will retard their upright Growth.

In removing these Plants, they should be taken up with as much Earth as possible, but Care must be had not to hurt the Roots of those Plants left in these small Spots, which should be two of the best Plants in each, and filling up the Holes made in taking out the Plants, with some of the neighbouring Mould, to prevent the Extremity of their Fibres from drying.

When your Plants are set in the new Plantation, a Quantity of small Stakes should be provided to fasten the young Trees that the Wind may not blow them out of the Ground, and before cover the Roots with short Litter, as before directed; then give them a gentle Watering to settle the Earth to the Roots; and if the Weather should prove very dry, you may repeat this gentle Watering two or three times; but be sure not to over water, which, I may venture to say, hath killed more new-set Trees of all Sorts, than the want of Water, or any other Accident whatever; therefore once for all, I would advise to have especial Regard that all new-set Trees are well mulsh'd with short Litter, or Mulch, but to have a great Care not to water too much, nor too often, which rots the young Fibres as fast as they are pushed forth, as I have often experienc'd; and have a great Care not to cut any of the Branches or Heads of these Trees, which is very hurtful (especially to all those of the resinous kind).

The Soil in which these Trees chiefly delight, is chalky Hills: And where there hath been not above six or eight Inches of Mould upon the Surface, I have seen the most vigorous Trees; as at a Seat belonging to the Hon. Sir *John Guise*, near *Great Marlow*, in *Buckinghamshire*, where there are vast Numbers of these Trees which drop their Seeds, and spring up without any Care or Culture. Notwithstanding these Trees chiefly delight in the before-mentioned Soil, yet will they thrive tolerably well in a poor Gravel (provided it be not too light and sandy) or in a strong Soil (if not too wet) but they love a moderate Elevation; and the *Silver* and *Common Firr*, with the *manured Pine*, require some Shelter from the North and East Winds, but the *Scotch Pine* and *Pinafter*, will grow on the North or East Side, or even upon the Summit of high Hills.

These Trees do not delight in dunged or rich Soils; but observe, it is much the better way to train up any sort of Plant in a Soil nearly akin to that you intend to plant them in, and not (as is too often the Practice) make a Nursery upon a good rich Soil, when the Trees there raised are designed for a poor barren Soil; and this I believe to be the Reason why Plantations of Trees procured from rich Nurseries are often seen to make but a poor Progress, if they live.

These two Trees left in each Spot, should not continue longer than six or seven Years together, when

when you should remove the least thriving Tree, leaving only one of the strongest in each Place; in the doing of which, great Care should be taken not to disturb the Roots of those left. The Season for this Work is before directed. These Trees which you now remove, will be of great Service for planting Vista's, or Ampitheatres of Ever-greens, or for Clumps in different Parts of Wildernesses; in the doing of which, observe to plant the *Scotch Pine* and *Pinastr* on the backward Part of these Plantations, these being the quickest and largest growing Trees (in our Country) and are the best able to resist strong Winds.

But I shall return to give some Account of the Way practis'd in raising these Trees, in smaller Nurseries, for the planting Avenues, or other Lines of Trees, which Method will do very well for the *Cedar*, *Larch*, or most other exotick Trees of these Kinds (provided they come not from too hot a Country.) You must provide yourself with some shallow Cases, not above six or eight Inches deep, and in Length and Breadth in Proportion to the Quantity of Seeds designed to be sown therein; but I would advise not to have them too big, which will render them immoveable, and it is upon this Account I chuse to have them sowed in Cases; viz. That they may be moved to any Position, and, if need be, carried into Shelter, in the Winter. The Bottom of these Cases should be bored full of Holes to let out the superfluous Moisture. Upon each of these Holes, should be laid a Piece of Tile, or an Oyster Shell, to prevent the Earth from stopping the Holes; and if the Bottom of the Cases were covered with small Stones, or any dry Rubbish, it would the better drain off the Moisture, and keep the Soil loose about the Roots of the young Plants.

The Soil which I chiefly prefer to fill these Cases with, should be taken from Pasture Ground, not too stiff, nor over light. This should have a Mixture of Lime Rubbish, and, (if inclining to a Clay) should also have a good Quantity of Sea-Sand mix'd therewith, and by no means sift or skreen this Mould, as is most commonly practis'd, but only take out the very large Stones, which might obstruct the Growth of your Plants: for when all the Stones are sifted out of Mould, the smaller Particles of Earth do so closely join together, as in wet Weather to become one solid Mass, and thereby prevent the Moisture from draining off, which will rot the Fibres of whatever is planted or sown therein; and when the Heat of Summer comes on the Surface of this sifted Earth, it will thereby be dried to a hard Crust, so as to prevent the Moisture from equally penetrating it.

Your Cases being filled as before directed, lay the Surface of the Mould even, and thereon sow your Seeds pretty thick, covering it with some of the same Earth broken fine, about a quarter of an Inch thick, laying thereon some Furze, as before directed. These Cases should be placed to have the Morning Sun, but must be skreened from the Sun in the Heat of the Day, by Trees or Hedges,

but by no means place them near a Wall or Pale, which would reflect too great a Heat upon them, and would very much prejudice the Plants while young. These Cases should be gently watered whenever there may be Occasion, but remember not to over-water, as was before hinted.

The Season for this Sowing, is the same as was directed for larger Plantations. A little after *Michaelmas* it will be convenient to remove some of the Earth upon the Surface, which, by this time, will often grow mossy; but this must be done with abundance of Care, lest the young Plants should thereby be disturb'd; and then lay thereon a little dry fresh Earth (well mix'd with Rubbish, or Sand, to keep it from retaining the Wet) observing not to let any of it remain upon the Tops of your young Plants: This will strengthen them the better to endure the Winter's Cold: And at this time it will be convenient to remove the Cases into a warmer Situation, as under some South Hedge, and raise them from the Ground with Bricks, that they may be kept the drier; and if it proves frosty, it will be necessary to lay some Furze (or such like light Covering) to guard them from the Injuries thereof; but I would not advise the Housing, unless they are of such Sorts as are brought from hotter Countries. They may remain in these Cases till the second Year, at which Time it will be convenient to remove them into Nurseries, where they may stand for four or five Years. The best Season for this Work, is towards the latter End of *March*, or the Beginning of *April*. The Manner of performing it being the same as was directed for larger Plantations, I shall refer to that; only I must beg leave to observe, that if the Soil you intend to plant them in, be a strong Clay, it will be necessary to raise a little Hill of lighter Earth, whereon to plant each Tree; and if Trees of this kind are removed at a larger Growth, it will be absolutely necessary to raise a Hill for each Tree (especially if the Soil be a Gravel or Chalk) and not, as is too often the Practice, dig a Hole into the Gravel, Chalk, or Clay, and fill it with Mould, and therein plant the Tree. This is next akin to planting them in Cisterns, which will hold the Water, and rot the Fibres: And if it so happens that the Trees live four or five Years, yet, after that, when the Roots are spread to the Extremity of these Holes, and can get no farther, the Trees grow knotty and stunt, and, perhaps, in a few Years, die. The not observing this, is the Reason we see so few Plantations in so thriving a State as might be wish'd for.

These Trees are very often at a Stand, during three or four Years after Planting, but when once they have establish'd themselves in their new Quarters, will sufficiently recompence for that, by shooting near a Yard annually; and some of these Trees will grow to a prodigious Magnitude; as sometimes to above an hundred Feet: And it hath been a Matter of Concern, to several ingenious Persons, that these Trees have not been more propagated, since they have so many Excellencies to recommend

commend them, viz. 1. The Facility of their Propagation. 2. Their delighting to grow in such Places where few other Trees will grow. 3. Their requiring no Culture or Dressing, after the first five or six Years. 4. Their Uniformity and Beauty. 5. Their perpetual Verdure and Sweetness: And lastly, Their great Usefulness in many Parts of Life. The Whole of which may be seen at large in that Valuable *History of Plants* written by Mr. Ray, Vol. II. Page 1400, &c.

The Seeds of these Trees, if preserv'd in the Cones, will keep good for many Years. I have been inform'd of a Gentleman who sow'd some Pine Seeds which were taken out of a Cone upwards of twenty Years old, and had some Plants from 'em; but from my own Knowledge, I can assure, that Seeds taken from Cones five Years old, grow very well, which is of singular Use to know; for since their Seeds will grow so old, we need not despair of bringing them from the most distant Parts of the World, (provided they are brought in the Cones) for otherwise they will keep but a short time, which is the Reason why the Seeds of the Silver Fir are so rarely good; for the Cones of this Tree, when ripe, fall to Pieces on the first Touch, and scatter out their Seeds, but the Seeds of all the Kinds of Pines are with some Difficulty taken out of the Cones; therefore it would be a very good Method to preserve the Seeds of Firs in dry Sand, until the Spring of the Year, which is the proper Season for sowing them.

ABROTANUM, or Southernwood; [*Αβρότανος*, which some derive of *Αβρός*, inhuman, because of its being bitterer than Wormwood itself: Others of *ἀβρότος*, of a Priv. and *βίσις* to feed, because it is not edible; or as others, *ἀβρότος* because it appears soft and delicate to the Sight; or of *ἀβρός* because it sends forth a strong Smell: With us it takes its Name from the Anglo-Saxon *Soðern-pubu*, *Southernwood*.]

This Plant is better known by its outward Appearance, than by any distinct Characters which can be given of it, agreeing in most Parts with the *Wormwood*, from which it is not easy to separate it.

Of this Plant there are six or seven different Sorts, which are Natives of *Europe*; but there are not above two of them common with us in the *English* Gardens, which are,

1. **ABROTANUM**; *mas angustifolium majus*. C. B. Pin. Common Southernwood.
2. **ABROTANUM**; *mas angustifolium minus*. C. B. Pin. The lesser and Narrower-leav'd Southernwood.

These two Sorts are easily increas'd, by planting Cuttings, in a shady Place, in any of the Spring or Summer Months. The first of these Sorts is sometimes used in Physick, being accounted good to destroy Worms in Children.

It is used in Gardens as an Under-shrub, and may be kept to a handsome round Head;

but it is chiefly raised by the Gardeners near *London* to furnish the Balconies of the Citizens, in the Spring and Summer Months, it enduring the Smoak of the City better than most other Shrubs or Plants, and affords (to some People) a grateful Smell.

ABROTANUM FOEMINA. Vide *Santolina*.

ABSINTHIUM, Wormwood; [*Ἀψίνθιον*, *q. d.* Unpleasant, of *ἀσθενεια*, Privative, and *δύστος*, which *Hesychius* interprets *πικρὸν*, Delectation; others will have it *Ἀπικτόν*, i. e. not potable, a Priv. and *πικρὸν* to drink, on Account of its Bitterness; others derive it of *ἀντὶ*, i. e. to touch or handle, by *Antiphrasis*, because no Animal touches it, by reason of its extreme Bitterness.] It is called in *English* from the Anglo-Saxon *Wýrm-pýrt*, i. e. Wormwort.

The Character of this Plant is,

To have an indeterminate Stalk, branching out into many small Shoots, which are furnish'd with Spikes of naked Flowers hanging downward; the Leaves are hoary, and of a bitter Taste.

There is a great Variety of this Plant (especially of the Sea Wormwoods) in *England*, which are promiscuously gather'd by the Herb-Women, and sold in the *London* Markets for the *Roman* Wormwood, and are thought by some preferable to that; but as these are for the most part accidental Varieties, so I shall only mention those Sorts which are cultivated in the Gardens.

1. **ABSINTHIUM vulgare majus**, J. B. Common Wormwood.
2. **ABSINTHIUM Ponticum tenuifolium incanum**, C. B. Pin. True Roman Wormwood.
3. **ABSINTHIUM maritimum lavendule folio**, C. B. Pin. Sea Wormwood, with Leaves like Lavender.
4. **ABSINTHIUM inspidum**, *absinthio vulgari simile*, C. B. Pin. The inspid Wormwood is so like the Common, as not easily to be distinguish'd, but by smelling and tasting the Herb, unless by such as are very skilful in Botany; but this Sort is not very commonly met with in *England*.
5. **ABSINTHIUM Arborefcens**. *Leb. Icon.* 753. Tree Wormwood.

The first of these Sorts is very common in *England*, in the Roads and upon Dunghills; but it is also planted in Gardens, for common Use: The second, third, and fourth Sorts are only found in curious Gardens of Plants. They are all easily raised, by planting of Cuttings and Slips in any of the Summer Months. The *Roman* and *Sea* Wormwoods are great Creepers at the Root, and will soon spread over a large Piece of Ground. The Tree Wormwood rises to be a Shrub five or six Foot high, and is kept in Gardens as a Rarity, and was formerly preserved in Green-houses, but hath been found hardy enough to endure our Winters abroad, if planted in Places sheltered

tered from the Northern Winds: This Shrub makes an agreeable Variety, in small Quarters of Ever-Greens or Flowering Shrubs; the hoary Leaves, which continue all the Year fresh, strike the Eye at a great Distance, and have a good Effect in diversifying the Prospect: This Shrub is easily raised from Cuttings, planted in any of the Summer Months, (under a Hedge or Wall) where they may have only the Morning Sun; and being frequently water'd, will take Root in a Month or six Weeks Time, when they may be remov'd to any Places where they are design'd to remain; observing in this (as in many other Shrubs and Plants which are Natives of a warmer Climate) to place them in a dry Situation: Wet, especially in Winter, is the most destructive to all these Sorts of Plants.

ABUTILON, [the Name is *Arabick*] Yellow Mallow.

The Characters of this Plant are,

It hath the whole Appearance of the Mallow, in both Leaves and Flowers; The Flower hath a single Cup; the Seeds, which are shap'd like a Kidney, are each of them lodg'd in a separate Cell.

There are three or four Species of this Plant known in Europe, as,

1. ABUTILON, *Dod.* The common Yellow Mallow.

2. ABUTILON *Indicum*: J. B. The Indian Yellow Mallow.

3. ABUTILON *Carolinianum reptans alceæ foliis gilvo flore, Act. Phil.* The Carolina Abutilon, with Leaves like the Vervain Mallow.

4. ABUTILON *Americanum amplissimo folio caule villoso, Plum.* The large-leav'd American Abutilon, with woolly Stalks.

5. ABUTILON; *Americanum, fructu subrotundo, pendulo, & capsulis vesicariis crispis conflato. Rand.* The American Abutilon, with roundish pendulous Fruit, whose Seed-Vessel is like a swell'd Bladder.

There are several other Varieties mention'd by *Plumier*, in his Catalogue of *American Plants*; but as these Plants have little Beauty, and are chiefly preserved in the Gardens of those only that are curious in Botany, I shall pass them over with bare naming, and only beg Leave to observe, That Mr. BRADLEY, PROFESSOR OF BOTANY at CAMBRIDGE, is greatly mistaken, in saying it grows wild in *England*; but it is plain he knew not the Plant, for he takes it for the *Althæa*, or Marsh Mallow.

ACACIA, Egyptian Thorn, or Binding Bean Tree. [*Ἀκία*, i. e. sharp, of *ἀκίζω*, Gr. to sharpen.

The Characters of this Tree are,

It hath ramose or branching Leaves; the Flowers adhere closely, and form a kind of Sphere or Globe; the Siliqua or Pods are hard and thick, inclosing several Seeds, which are separated by transverse Diaphragms from each

other, and are closely surrounded with a sweetish pulpy Substance.

There are a great Variety of these Trees cultivated in the Gardens of *England* and *Holland*, which have been brought from *Africa* and *America*; and are some of them hardy enough to endure our Winters Abroad (especially such as are Natives of *North America*); others are very tender, and are only to be kept in the warmest Stoves. I shall first set down the Names of such as are to be met with in the *English* Gardens, and then give some Account of their Culture.

The Species of this Tree are,

1. ACACIA *Americana abruæ foliis triacanthos, five ad axillas foliorum spina triplici donata; Pluk. Mantif.* 1. The American Acacia with triple Thorns; or the large-thorn'd Acacia, commonly call'd, The Locust Tree in the *West-Indies*.

2. ACACIA *Americana palustris abruæ foliis spinis rarioribus.* Water Acacia from *Carolina*, with very few Spines.

3. ACACIA *vera. J. B.* The true Egyptian Acacia.

4. ACACIA *Indica, foliis scorpioides leguminosæ, siliquis fuscis teretibus resinosis. II. L.* The Indian Acacia, with taper resinous Pods.

5. ACACIA; *similis Mexicana, spinis cornu similibus. Breyn.* The great horn'd Acacia. *Vulgô.*

ACACIA, *quodammodo accedens, five Ceratia & Acacia media Jamaicensis spinosa, bigeminatis foliis, flosculis flammeis, atrorubente, fructu siliquis intortis. Pluk. Phyt.* Acacia, with branching Leaves, and twisted Pods.

7. ACACIA; *arborea, major, spinosa, pinnis quatuor majoribus, subrotundis, siliquis variæ intortis. Sloan. Cat. Plant. Jam.* large four-leav'd Acacia, with twisted Pods.

8. ACACIA, *folio lentisci, sempervirens, spinis vidua. Hort. Amst.* Ever-green Acacia, without Thorns.

The first of these Acacia's Dr. *Plukenet* mentions to have been rais'd in the Garden of the Bishop of *London* at *Fulham*, about the Year 1698. since which Time it hath been rais'd in great Plenty in several Gardens near *London*, where there are several very large Trees. This Sort hath produced Flowers in the *Physick Garden* at *Chelsea*, which are very minute, and of an herbaceous Colour; and the last Year, viz. Anno 1729. it produced ripe Fruit in the Gardens of the Bishop of *London* at *Fulham*. The Seeds of this Tree are frequently brought over from *Virginia* and *Carolina*, by the Name of *Locust*, which, I suppose, is a general Name for most Trees which produce Pods, in which are contained a sweetish Pulp surrounding the Seeds.

The second Sort is nearly allied to the first, but hath very few Thorns; the Shoots are greener, and the Tree is of quicker Growth. The Seeds of this Tree were sent from *Carolina* Anno 1724, by Mr. *Catesby*, by the Name of *Water Acacia*, as being an Inhabitant of wet Soils. The Flowers of this Tree hath not yet

yet appear'd in *England*, so that I can give no Account how this differs in that Particular from the first.

The third Sort is the Tree from whence the true *Succus Acaciae* is taken; which altho' mention'd as a Native of *Egypt*, yet is also found in divers Parts of *America*, from whence the Seeds of this Tree have been sent into *England*, which have been rais'd in several Gardens near *London*.

The fourth Sort is the most common Kind in *Jamaica*, *Barbadoes*, and the other warm Parts of *America*; and hath, for the Sweetness of its Flowers, been dispers'd thro' most Parts of *Europe*; which altho' a Native of the warmer Parts of the *Indies*, yet hath been made familiar to the *Italian Gardens*, and is cultivated in great Plenty in *Portugal* and *Spain*.

The fifth Sort is, at present, very rare in *England*, and only to be found in some curious Gardens. This Tree produces its Spines by Pairs, which are extream large and crooked, and of a whitish Colour; but I don't remember ever to have seen this Flower.

The sixth Sort was brought from the *Bahama Islands* by Mr. Catesby, Anno 1726. The Seeds of this Plant (which are flat, and one half of a beautiful red Colour, the other half a deep Black) grow in long twisted Pods; which, when the Seeds are ripe, open on one Side, and let the Seeds out; which hanging by a small Thread for some time out of the Pods, make a very agreeable Prospect: The Leaves of this Tree branch out and divide into many Ramifications; the Lobes are roundish, and placed in a very regular Order: The Flowers have not as yet appear'd in *England*, but from a Painting done from the Plant in the Country, they seem to be very beautiful.

The seventh Sort was brought from *Jamaica*, and is growing in the *Physick Garden* at *Chelsea*: This hath four large Lobes to each Leaf; the Spines are short, stiff, and crooked, and the Seeds grow in twisted Pods. This Plant is well describ'd in Sir Hans Sloan's *Natural History of Jamaica*.

The eighth Sort was brought first into *England* from *Holland*, and is probably a Native of *Africa*. This Plant is an Ever-green, and without Spines, which is peculiar to this Sort alone. The Flowers of this Tree I have never yet seen.

These Trees are all propagated by sowing their Seeds on a hot Bed in the Spring of the Year, which will in a short Time appear above Ground, when you should prepare another fresh Hot-bed, which if intended for such Sorts as are very tender, should be pretty warm; but if for such as are brought from the Northern Parts of *America*, should be of a very moderate Heat; then you should be provided with a Quantity of a small Half-penny Pots, which should be fill'd with fresh light sandy Earth; these should be plung'd into the Hot-bed, and as soon as the Earth in the Pots is warm, which will be in about 24 Hours, you should take up the young Plants carefully out of the first Hot-bed, planting a single one

in the Middle of each of these Pots, giving them a gentle Watering to settle the Earth to their Roots, and screening them with Mats over the Glasses, from the Heat of the Sun until they have taken Root; after which Time you must give them Air, by raising the Glasses, in proportion to the Heat of the Weather, or to the Constitution of the Plants.

The first and second Sort being very hardy, may have a greater Proportion of Air, and by *Midsummer* should have the Glasses intirely taken off, that they may be hardened to endure the open Air by degrees: These, the first and second Winter, should be shelter'd in a common Hot bed Frame, until they are grown woody; after which Time (in the Spring of the Year) they may be turn'd out of the Pots into the open Ground, where they are intended to remain; which should be in Wilderness Quarters; or Clumps of Trees, where they may be shelter'd from the Fury of violent Winds, otherwise they will be very subject to be split thereby.

When these Trees have arisen to the Height of 8 or 10 Feet, they will then make very strong and vigorous Shoots; which should be annually shortned, that the Heads of the Trees may be closer, and their Branches by this Means, will be much less liable to break with Winds, than when they are permitted to remain at full Length, and the Trees will be much the handsomer.

The fourth, fifth, and eighth Sorts are tenderer, and should be kept in the Hot-beds till *July*, when they may be exposed to the Air by degrees, tho' the Glasses should not be quite remov'd from them the first Year: These must be set in a Stove the first and second Winters, while young, as being then pretty tender; but when they are grown woody, will endure in a good Green-house very well, and may be exposed in Summer-time, with Oranges, Myrtles, &c. These, if kept in a Green-house, will require but little Water in Winter, especially those which shed their Leaves, as being at that Season incapable of discharging a Redundancy of Moisture; their Leaves, which were the greatest Instruments in throwing off superfluous Moisture by Perspiration, being gone, the whole Tree seems to remain for a certain Time in a State of Rest.

The third, sixth, and seventh Sorts are very tender, (especially while young) and therefore should have a Hot bed of *Tanner's Bark*; and as they increase in Bulk, should be shifted into bigger Pots; The Earth for these should be a little lighter, and more inclined to a Sand than for the other Sorts, but never give them too big Pots, which is full as bad to these as to *Orange Trees*, neither give them too much Water, especially in Winter: The third Sort being the hardiest of the three, will, when grown to be woody, stand in a common Stove amongst *Guava's*, *Viburnums*, &c. which would be kept to the Point of temperate Heat in Winter; and in the Summer-time, in warm Weather, may enjoy the free open Air: But the sixth and seventh Sorts must have a Bark Stove in Winter, nor should they be expos'd to the open Air in Summer,

at least for four or five Years, until they are grown very woody, for they are very tender, and with great Difficulty preserv'd in this Climate: The Stove in which these should be placed in Winter, must be kept up to about 20 Degrees of Heat above the temperate Point, as mark'd on Mr. *Fowler's Botanical Thermometers*: These should have very little Water in Winter, but in the Summer-time will require frequent Refreshings, though at that Season it should not be given them in great Quantities at one time. The sixth Sort is an Ever-green, but the seventh sheds its Leaves just before the new ones come on, so that it is naked of Leaves about a Month or six Weeks in the Spring of the Year; which hath occasion'd some People to throw them away as dead, when if they had let them remain, they would have come out fresh again. This I thought proper to mention, in order to caution People not to be too hasty in throwing out Trees for dead, but preserve them through the succeeding Summer, to see if there is any Life left in them; for I have known several Plants which after having been given over by skilful Persons for dead, have, the July following, shot out vigorously again; and others which have been destroyed to the Surface of the Earth, have risen again from the Root.

The first and sixth Sorts are figur'd in Dr. *Plukenet's Phytographia*. The third Sort is figur'd in most of the old Botanick Writers, as *John Bauhin*, *Dodonæus*, *Parkinson*, &c. The Pods of this kind are jointed and compressed into a sort of Isthmus between every Seed. The fourth Sort is extremely well figur'd, and describ'd in the *Hortus Farnesiana* by *Aldinus*. The fifth Sort is very well figur'd, and describ'd in the *Hortus Amstelodamensis*. The seventh Sort is figur'd in *Piso's History of Brasil*; but the second Sort is new, and not figur'd in any Botanick Books.

ACACIA Germanorum; vide Prunus Sylvestris.

ACACIA Virginiana, vide Pseudoacacia.

ACAJOU, or Cajou. The Cashew Nut.

The Characters are,

The Cup of the Flower (which is produced at the Extremity of a Foot-stalk) is oblong, and quinquefid; the Flower consists of one Leaf, which is divided into five long narrow Segments; in the Bottom of the Calyx is the Ovary, which becomes a soft Pear-shap'd Fruit, upon the Apex of which grows a Vessel, in which is contained one Kidney-shap'd Seed.

There is but one Species of this Plant yet known, which is,

ACAJOU; Thev. Franc. Antarct. The Cashew Nut.

This Tree is very common in many Parts of America, particularly in Jamaica and Barbadoes, where it grows to be a very large Tree, but with us in England (notwithstanding all the Care it can possibly have) will rarely stand through our Winters; or if it is by Art preserved, in very warm Stoves, yet is so very

slow of Growth, especially after the first Year, as scarcely to be discern'd in its Progress.

The Seeds of this Tree, if sown in a good Hot-Bed in the Spring of the Year, will in a short time appear above Ground, in so strong a manner that any one, who hath not been conversant with this Plant, would imagine it to be of very quick Growth; for I have known these Plants in two Months from the time of sowing their Seeds, above six Inches in Height, and very strong; which in about two Months time more have been at a Stand, from which time they have scarcely advanced two Inches in a Year, with all the Art and Skill which could be used to them; nor have I ever seen a Plant of this Kind above two Feet high, tho' I have had some of them that have been three or four Years old: They are also in their own Country of very slow Growth, rarely producing either Flowers or Fruits, until they are 15 or 16 Years old from Seeds, so that the Inhabitants of the *West Indies* plant them from large Branches taken from the old Trees, which with them take Root very well, and in two Years time produce Fruits.

The Plants of this Kind which are raised in England, should be planted in small Pots fill'd with fresh, light, rich Earth, and must be plung'd into a Hot-bed of *Tanner's Bark*, and often refresh'd with Water: these should be kept, in Winter, in a Bark Stove, amongst the tenderest Exotick Trees, and should not be exposed to the open Air even in the hottest Season.

One Plant of this Kind flower'd in the Garden of Sir *Charles Wager*, at *Parson's-Green* near *Fulham*, tho' not above two Years old, but it soon after perish'd without producing any Fruit.

The Seeds of this Tree are the *Anacardium Occidentale*, or Western *Anacardium* of the Shops: The outer Covering of this Seed is very full of a sharp, acrid Oil, which will give great Pain to the Mouth, if bitten or chew'd; if burnt off by a Candle, it will emit a Flame of various Colours: The Kernel within is very sweet, and esteem'd wholesome.

ACANACEOUS Plants [Of *Ἀκαναῖος*, Gr. or *Acuo*, Lat. I sharpen, on account of the Prickles they are beset with] are such as are of the Thistle Kind, which have Heads, and are prickly.

ACANTHUS [*Ἀκανθός*, so call'd, as some say, of *ἄκανθα*, a Thorn, or as others say, of the Youth *Acanthus*, whom the Poets fable to be metamorphos'd into the Flower of this Herb.] This is call'd *Branca Ursina*, or *Bear's-breech*.

The Characters of this Plant are,

The Leaves are somewhat like those of the Thistle; the Flowers are labiated; the under Lip of the Flower is divided into three Segments, which in the Beginning is curl'd up in form of a short Tube; in the Place of the upper Lip are produced the Stamina, (or Seeds) which support the Pointals: the Cup of the Flower is composed of

of Leaves which are prickly ; the upper Part of which is bent over like an Arch, and supplies the Defect of the upper Lip of the Flower : The Fruit is of an Oval Form, which is divided in the Middle into two Cells, each containing one single smooth Seed.

There are four Species of this Plant to be found in the Gardens of the Curious, viz.

1. ACANTHUS; *sativus*; vel *mollis Virgilii*. C. B. The smooth-leav'd Garden Bear's-breech.

2. ACANTHUS; *aculeatus*. C. B. The prickly Bear's-breech.

3. ACANTHUS; *rarioribus* & *brevioribus aculeis munitus*. Tourn. The middle Bear's-breech, with short Spines.

4. ACANTHUS; *Lusitanicus*; *amplissimo folio lucido*. The Portugal Bear's-breech, with large shining Leaves.

The first Sort is what is used in Medicine, and is supposed to be the *Mollis Acanthus* of Virgil. The Leaves of this Plant is cut upon the Capitals of the Corinthian Pillars, and was formerly in great Esteem with the Romans.

They are all very pretty Varieties, and fit for large Gardens, but should have a warm Situation, and a dry Soil. They are easily propagated, by parting the Roots in February or March, or by Seeds sown at the same Time. The second and third Roots are apt to creep at the Root, therefore should have Room, and must not be planted amongst other Flowers, lest they over-grow and destroy them.

ACAULIS, or ACAULOS; of a Neg. and Caulis, [a Stalk or Stem] i. e. without Stalk : A Plant is said to be *Acaulis*, or without Stalk, whose Flower rests on the Ground.

ACER; The Maple-Tree, [so call'd according to Vossius, of *Acris*, L.] because of the very great Hardness of the Wood.

The Characters are ;

It hath jagged, or angular Leaves; the Seeds grow together in hard wing'd Vessels.

There are in England eight or nine Species of this Tree, viz.

1. ACER, *majus*, multis falso *Platanus*. J. B. The greater Maple, falsely call'd, The Sycamore Tree.

2. ACER, *majus*, *foliis eleganter variegatis*. Hort. Edin. The greater Maple, with strip'd Leaves, commonly call'd, The Strip'd Sycamore.

3. ACER, *campestre* & *minus*. C. B. The common, or lesser Maple.

4. ACER, *Virginianum*, *folio majore*, *subtus argenteo*, *supra viridi splendente*. Pluk. Phyt. The Virginian flowering Maple.

5. ACER, *Americanum*, *folio majore*, *subtus argenteo*, *supra viridi splendente*, *floribus multis coccineis*. The American flowering Maple, with larger Bunches of Scarlet Flowers.

6. ACER, *maximum*, *foliis trifidis vel quinquesidis Virginianum*. Pluk. Phyt. The Virginian Ash-leav'd Maple.

7. ACER, *platanoides*. Munt. The Norway Maple, with Plane Tree Leaves.

8. ACER, *platanoides foliis eleganter variegatis*. The strip'd Norway Maple.

These Trees are easily propagated by sowing the Seeds soon after they are ripe in an open Bed of common Earth, covering them about half an Inch thick with light sandy Earth; the Spring following they will appear above Ground, and if kept clear from Weeds, will grow above a Foot high the first Summer: The Michaelmas following (if they are thick in the Seed-bed) you may take out a Part of them and transplant into a Nursery, in Rows at three Feet distance, and two Feet asunder in the Rows; in which Place they may remain three or four Years, when they will be large enough to plant out for good.

The first Sort is very proper to make Plantations near the Sea, or to shelter such Plantations of Trees as are too nearly situated thereto: This Tree thrives, and resists the Spray which is usually blown from the Sea, better than most other Trees do. The variegated Sort is also raised from Seeds of the same Kind: Most of the Plants so rais'd, will be as finely strip'd as the old Plant from whence the Seeds were taken, which is not common to many other variegated Plants.

The common Maple is too well known to need any particular Account, it being a very common Tree in Hedge-rows in most Parts of England; it is rais'd in the same Manner with the former.

The Virginian flowering Maple was rais'd from Seeds which were brought from Virginia many Years since by Mr. John Tradescant, in his Garden at South Lambeth near Vaux-Hall, and since, in the Gardens of the Bishop of London at Fulham, where it has flower'd for several Years, and produces ripe Seeds, from whence several Trees have been rais'd: It may be also propagated by laying down the young Branches early in the Spring, giving them a little Slit at a Joint, by which Means they will have taken sufficient Root by that time Twelve-months, to be transplanted out: They require a Situation a little defended from the North East Winds, especially while young. This Tree commonly flowers in the Beginning of April, and the Seeds are ripe in five or six Weeks after; at which Time they should be sow'd, for they are very apt to perish if kept long out of the Ground.

The other flowering Maple was sent from America to Sir Charles Wager, and flourishes in his curious Garden at Parson's Green near Fulham: The Flowers of this Kind come out in very large Clusters, and surround the younger Branches, so as to appear at a small Distance covered therewith. This Tree is at present very rare in Europe, but as it produces ripe Seeds in England, so it is to be hoped it will in Time be more common in the Gardens of the Curious.

The Ash-leav'd Maple is a very strong shooting Tree, and is in Virginia one of the largest Trees of this Kind: It must be planted in Places not too much exposed to violent

D

Winds,

Winds, it being subject to split therewith. This Tree ripens Seeds very well in *England*, by which Means it is easily propagated, or by laying down the Branches (as directed for the flowering Maple.)

The *Norway* Maple grows with us to a very large Size, equalling the greater Maple for Bulk, and I believe will answer the same Purposes, for sheltering Plantations near the Sea, and is by far the handiomer Tree near an Habitation; for the greater Maple is very subject to exude a sweet clammy Juice from the Pores of the Leaves, which lodges upon the Surfaces thereof, and thereby intices vast Quantities of Insects, which eat the Leaves full of Holes, and render them very unsightly.

The *Norway* Maple has a milky sharp Juice, so that few Insects care to prey thereon; by which means the Leaves are seldom eat or defaced: This Tree is also rais'd by Seeds, of which it affords great Quantities, which rise and grow equally as well as the common Sort.

The variegated Kind is propagated by inoculating a Bud of the strip'd Kind into one of the plain Sort, though I am not at present sure whether it will take upon any other Sort of Maple, not having made the Experiment; but I believe it can scarce fail: Most, if not all the other Sorts of Maples, take very well upon each other.

There is another Sort of Maple, which is very common in *Virginia*, and is known by the Name of the *Sugar Maple*; from which Tree the Inhabitants of that Country make a very good sort of Sugar, and in large Quantities; But this Tree is at present very rare in *Europe*; though I am of Opinion, that the People make Sugar from more than one Sort of Maple; Mr. Ray and Dr. Lister prepared a tolerable good Sort of Sugar from our greater Maple, by tapping some of the Trees in their bleeding Season; and I have observ'd, upon cutting off a Branch of the Ash-leav'd Maple in *February*, a great Quantity of a very sweet Juice hath flow'd out for several Days together.

The Timber of the common Maple is far superior to the *Beech* for all Uses of the Turner, particularly, *Dishes*, *Cups*, *Trenchers* and *Bowls*; and when it abounds with Knots (as it very often doth) it is highly esteem'd by the Joiners for Inlayings, &c. and also, for the Lightness of the Wood, is often employ'd by those that make Musical Instruments; and for the Whiteness of its Wood, is in great Request for *Tables*, &c.

ACETOSA; [of *Acetofus*, eager, four, L.] Sorrel, so called of the *Anglo-Saxon*, *rup*, four.

The Characters are;

This Plant agrees with the Dock in all its Characters, and only differs in having an acid Taste.

There are several Varieties of this Plant which are cultivated by the Curious in Botany, but there are not above two or three Sorts which are worthy propagating for Use, which I shall

mention, passing over the rest as Varieties fit only for the Curious to amuse with.

1. **ACETOSA**, *pratensis*. C. B. The Common or Meadow Sorrel.

2. **ACETOSA**, *Muscovitica*, *Sterilis*. M. H. The Northern barren Sorrel.

3. **ACETOSA**, *rotundifolia*, *bortensis*. C. B. The Round-leav'd or French Sorrel.

The first of these Sorts, though but small in the Fields, yet when sown in Gardens, will produce large fair Leaves, and is the same Sort which is commonly cultivated in Gardens. It must be sown early in the Spring, in a shady moist Border; and if the Plants are afterward planted out in another shady Border, four or six Inches square, it will produce larger Leaves, and continue longer. This is the common Sorrel used in Medicine; but the Northern barren Sorrel is preferr'd to it in the Kitchen-Garden, it rarely running to Seed, but is increased by parting the Roots either in Spring or Autumn, and is fit for Use all the Year round.

The Round-leav'd (or *French*) Sorrel, is the most grateful Acid, and is preferr'd to the other two Sorts for Kitchen Use; it is also a medicinal Plant, and should not be wanting in any good Garden: It is a great Runner at the Root, by which Means it is easily propagated, and must be planted at a large Distance, a Foot Square at least; it will agree better with an open Situation than the other two Sorts.

ACETOSELLA; *vide Oxys*.

ACHILLÆA; *i. e.* Millefolium.

ACINOS; Stone, or Wild Basil

The Characters are;

It hath Leaves like those of the lesser Basil; the Cup of the Flower is oblong and furrow'd; the Flowers are produced in Bunches, on the Top of little Footstalks, which arise from between the Footstalk of the Leaf, and the Stalk of the Plants, in which it differs from *Serpyllum*.

The Species are;

1. **ACINOS**; *multis*. J. B. Wild Basil.

2. **ACINI**; *pulchra Species*. J. B. Broad-leav'd Austrian Wild Basil.

The first of these Plants is very common on dry arable Land in many Parts of *England*, but especially on gravelly or chalky Hills: It is an annual Plant, sowing itself, and rising again early in the Spring: This is not cultivated in Gardens, nor doth it care to grow on a good Soil; but it may be propagated in a dry poor Soil, by sowing the Seeds so soon as they are ripe. This Plant hath been brought to the Markets by the Herb-women for the Mountain Poley.

The second Sort is preserved in curious Botanick Gardens, but is a Plant of no great Beauty or Use.

ACINUS, or **ACINI**; By good Authors is used not for the Grape-stone, but the Grape itself, as *Columella*, *cum expresseris vinacea quæ acinis celantur*: It is commonly used for those small Grains growing in Bunches, after the

the manner of Grapes ; as the Sambucus, Ligustrum, &c.

ACONITUM, Wolf's-bane ; [*Akrision*, which some derive of *akros*, a Well-stone or Rock, because it grows on bare rocky or stony Places ; others of *akros* and *akros* Dust, because it grows without Earth ; others of *Akros* and *akros*, a Dart, because the Barbarians used to daub their Darts therewith ; others of *akros* and *akros* to accelerate, because it hastens Death.] The *English* call it Wolf's-bane, of the *Anglo-Saxon* *Wulfe-bana*.

The Characters are ;

It hath circumscrib'd roundish divided Leaves ; the Flowers consist of four Leaves, which are shaped like a Monk's Hood : Each of these Flowers are succeeded by three or more Pods, which contain several rough Seeds ; the most Part of these Species are deadly Poison.

There are several Sorts of this Plant in the Botanick Gardens Abroad ; but in *England* we have not above four Sorts, which are,

1. **ACONITUM** ; *lycoctonum, luteum*, C. B. The yellow poisonous Wolf's-Bane.

2. **ACONITUM** ; *luteum, majus, ampliore caule, amplioribusque foliis*. Dod. The largest yellow Wolf's bane.

3. **ACONITUM** ; *caeruleum, sive napellus*. II. C. B. The large blue Wolf's-bane, or Monk's-hood.

4. **ACONITUM**, *salutiferum, sive Authora*. C. B. The wholesome Wolf's-bane.

The third Sort of Wolf's-bane is very common in almost all old Gardens, and is usually known by the Name of Monk's-hood, the Flower resembling a Friar's Cowl, from whence it had that Name ; the Flowers of this Kind are commonly brought to Market in *May*, to furnish Flower-pots for Chimnies ; but it being a very poisonous Plant, should not be put in the Way of Children, lest they should prejudice themselves therewith : The Roots of this Plant increase abundantly, soon over-running a large Piece of Ground, therefore should be confin'd in some abject Part of the Garden, or planted under Trees, it being very hardy, and growing in almost every Soil or Situation.

The yellow Sorts are less common, and are only preserved in the Gardens of the Curious ; they flower in *June* and *July*, and are increas'd by parting the Roots in *Autumn*, but must have a more open Exposure than the Blue.

The wholesome Kind is rarely to be met with in the *English* Gardens, although it is equally as hardy as any of the other Sorts : This is increased as the other Sorts, but requires a looser Soil than they do : This is sometimes used in Physick, and is supposed to be an Antidote to the Poison of the Wolf's-bane.

ACONITUM HYEMALE, or Winter Wolf's-bane.

The Characters are ;

The Leaves are like those of the Wolf's-bane ; the Flowers (which are produced in the Center

of the Leaves) are like those of the Ranunculus ; with many Stamina, or Threads in the Center, and in all other respects agree with the Hellebore ; to which the learned Doctor Boerhaave hath made it a Congener.

This is one of the earliest Flowers in the Spring, often appearing by the Middle of *January*, for which Reason it deserves a Place in every curious Garden ; it is very apt to increase by the Root, but should not be too often transplanted : The best Time to remove the Roots is in *May* or *June*, just as the green Leaves are decay'd, before they are quite gone off, it being very difficult afterwards to find the Roots : This Plant will thrive in almost any Soil or Situation.

ACRIVIOLA ; [Of *Acer*, sharp ; and *Viola*, Violet, i. e. Sharp Violet] commonly called *Nasturtium Indicum*, or *Indian Cress*.

The Characters are ;

The Leaves are round, umblicated, and placed alternately ; the Stalks are trailing ; the Cup of the Flower is quinquef'd ; the Flowers consist of five Leaves, which are in Form of a Violet ; the Seeds are roundish, and rough, three of them succeeding each Flower.

There are five Varieties of this Plant in the *English* Gardens, viz

1. **ACRIVIOLA** ; *Frid. Cef. T. 935*. The lesser Indian Cress.

2. **ACRIVIOLA** ; *flore sulphureo*. Boerb. The lesser yellow Indian Cress.

3. **ACRIVIOLA** ; *maxima odorata*. Boerb. The great Indian Cress.

4. **ACRIVIOLA** ; *maxima odorata, flore, sulphureo*. Boerb. The great yellow Indian Cress.

5. **ACRIVIOLA** ; *maxima, odorata, flore pleno*. The great double Nasturtium, or Indian Cress.

The four first Sorts are commonly sow'd in *March* or *April*, in a good Soil and warm Situation : They are great Climbers, and should have a Hedge or Palisado to run upon, to prevent their lying upon the Ground, which is apt to rot them : They begin to flower in *June* or *July*, and continue till the Frost comes, which soon destroys the whole Plant, unless shelter'd therefrom. The Flowers are very good in Sallads, and are much in Use to garnish Dishes : The unripe Seeds afford a warm agreeable Pickle.

The double Sort producing no Seeds, is only increased by planting Cuttings in any of the Summer*Months, and must be carefully preserved in Winter, it being very subject to rot, if kept too close, or if it hath too much Water in Winter, but must be intirely kept from Frosts.

This Plant, if confined in Pots fill'd with poor Soil, will be less subject to ramble, and much more productive of Flowers ; whereas if it is planted in the full Ground, or potted in a rich Mould, it will extend its Branches to a great Distance, and the Flowers will be very thinly placed upon the Plant, so that the greatest Beauty of the Plant, which consists in the

the Number of its Flowers, is lost. The Flowers of this Kind are much better to garnish Dishes than those of the single; but for Use, the single is preferable to this in Sallads, being of a warmer Taste; as is observ'd of all single Flowers, that they are preferable to the Double of the same Kinds, for medicinal, or other Uses, as being much stronger in Smell and Taste; for the Multiplicity of Petals deprive the Flowers of the Organs for Generation, in which are contain'd the Essence of the Flower.

ADHATODA. The Malabar Nut.

The Characters are;

The Leaves grow opposite; The Cup of the Flower is oblong, and consists of one Leaf; the Flower is monopetalous, of an anomalous Figure, and consists of two Lips; the uppermost is crooked, and is raised in Form of an Arch; the under Lip is divided into three Segments, and hangs downward; the Ovarium becomes the Fruit which is in Form of a Club, and is divided into two Cells, in which are contained flat Heart-shap'd Seeds.

There are but two Species of this Plant known at present, which are,

1. ADHATODA; *Zeylaeufium*. H. L. The common Malabar Nut.

2. ADHATODA; *Indica*; *folio saligno, flore albo*. Boerb. The Willow-leav'd Malabar Nut, commonly call'd, The Snap-tree.

These Plants are both rais'd by Cuttings, planted in any of the Summer Months, which must be shaded and frequently water'd; about August they will have taken Root, and must then be transplanted into Pots, fill'd with light sandy Earth, mixed with rotten Dung: They must have a good Green-house in Winter, and require often but gentle Waterings: In the Summer they may be exposed to the open Air, but should be shelter'd by Hedges or Trees from strong Winds. These Trees do frequently flower in England, but have never, that I have heard of, produced any Fruit with us.

ADIANTHUM; i. e. Maiden-hair.

ADNATA, ADNASCENTIA, are those Offsets, which by a new Germination under the Earth proceed from the Lily, Narcissus, Hyacinth, &c. which afterwards grow to true Roots, which the French call *Cayeux*.

ADONIDIS HORTI, i. e. the Gardens of Adonis, are Plants, Flowers, &c. in Pots or Cases, set on the Outfides of Windows, in Balconies, &c.

ADONIS, or FLOS ADONIS, Bird's-Eye, or Pheasant's-Eye.

The Characters are;

The Leaves are like Fennel, or Chamomil; the Flowers consist of many Leaves, which are expanded in Form of a Rose; the Seeds are collected into oblong Heads.

There are but three Varieties of this Plant to be met with in the English Gardens, viz.

1. ADONIS, *bortensis, flore minore atrov-bente*. C. B. The common red Bird's-eye.

2. ADONIS, *sylvestris, flore luteo, foliis longioribus*. C. B. The long-leav'd yellow Bird's-eye.

3. ADONIS, *bellebori radice, bupthalmi flore*. H. L. The Hellebore-rooted Pheasant's-eye, commonly call'd, The Fennel-leav'd black Hellebore.

The first of these Sorts is very common in England, and is sown in open Borders as an annual flowering Plant to adorn Gardens: The best Time to sow it is in August, soon after the Seeds are ripe, when it rarely fails to grow, and is very hardy, seldom being hurt by Cold.

These Plants will flower in June and July, and the Seeds will ripen soon after; but those which are sown in the Spring very often fail to grow, or at least remain till June or July before they appear, so that they seldom produce good Seeds the same Year, and rarely live over the Winter after flowering.

This Plant grows wild in some Parts of England, particularly near the River Medway, about three Miles above Rochester Bridge.

The yellow Sort is uncommon in England, and only to be found in some curious Gardens: This makes a pretty Diversity with the former, and must have the same Culture.

The third Sort is still more rare than any of them; it is an abiding Root, and is increas'd by parting the Roots in August, or by sowing the Seeds, soon after they are ripe, in light sandy Earth: The Seedlings will be two Years before they blow, but the Offsets will flower the succeeding Spring: This produces its Flowers in March, or early in April, and is not a despicable Plant in the most curious Gardens.

This Plant is used in Medicine by the Germans, as the true Hellebore.

ÆSCHYNOMENOUS Plants; [of *ἄισχυς*, of *ἄισχυς*, Gr. I am ashamed.] Those Plants are commonly call'd *Sensitive*, or sensible Plants, as giving some Tokens of Sense: They are such whose Frame and Constitution is so nice and tender, that on the Touch or least Pressure of one's Hand they will contract their Leaves and Flowers as if sensible of the Touch.

ÆTHER; [*ἄϊθρ* of *ἄϊθρ*, Gr. to burn or flame; some of the Ancients having supposed it to be of the Nature of Fire.] It is usually understood to be a thin subtil Matter or Medium, much finer and rarer than Air itself, which commences from the Limits of the Atmosphere, and possesses the whole heavenly Space. See *Atmosphere* and *Air*.

AGERATUM; [*ἄγρ* of *ἄγρ*, Gr. old Age, because it does not wither, nor easily grow old.] Maudlin.

The Characters are;

The Flowers are digested into loose Umbels; but, in other respects, it is very like the Coastmary.

There are several Species of this Plant preserved in the Botanick Gardens; but as there are

are not above three Sorts which (either for Use or Beauty) deserve to be cultivated; I shall only mention those, and pass over the rest.

1. *AGERATUM, foliis seratis. C. B.* The common Maudlin.

2. *AGERATUM, quæ ptarmica incana, pinnulis cristatis. T. Voy.* The hoary Oriental Maudlin.

2. *AGERATUM, Peruvianum, arboreum, folio lato, serrato. Boerb.* The Peruvian Tree Maudlin, *falsly called*, The Jesuit's Bark Tree.

The first of these Plants is propagated in Gardens, for medicinal Use; it is increased by parting the Roots either in Spring or Autumn, and requires a light Soil and open Situation, where it will thrive abundantly.

The second Sort is somewhat tender, and must have a dry Soil, and warm Situation: This is increas'd by planting the Cuttings in any of the Summer Months. This Plant was suppos'd by the Ancients to be what produced the Worm-Seed; but this is confuted by all the Moderns: However, it deserves a Place in a Garden, for its fine hoary Leaves, together with its Umbels of yellow Flowers, which continue most Part of the Summer.

The third Sort grows to a Shrub of eight and ten Feet in Height; it is increased by planting the Cuttings in any of the Summer Months, or by laying down the Branches: It requires frequent Waterings, and must be housed in hard Winters, but will endure our common Winters in the open Air. This Tree, when it first came into England, was suppos'd to be the Tree from which the *Peruvian Bark* was taken; but this has been confuted long since: There is no great Beauty in it, but it may have a Place in a Collection for its Oddness.

AGNUS CASTUS; *vide* Vitex.

AGRIFOLIUM; *vide* Aquifolium.

AGRIMONIA; Agrimony. [Of *Ἀγρίμων*, because it is good against the *Ἀγρίμωλον* or *Ἀγρίμωρον*, i. e. the Fault of the Eyes.] Agrimony, *Aggrimonia*, *Anglo-Saxon*.

The Characters are;

The Leaves are rough, hairy, pennated, and grow alternately on the Branches; The Calyx (or Flower-cup) consists of one Leaf, which is divided into five Segments: The Flowers have five or six Leaves, and are form'd into a long Spike, which expand in Form of a Rose: The Fruit is oblong, dry and prickly, like the Burdock; in each of which is contain'd two Kernels.

There are several Varieties of this Plant, but two of them only deserve our Care, *viz.*

1. *AGRIMONIA, Officinarum. Tourn.* The Common or Medicinal Agrimony.

2. *AGRIMONIA, odorata. Camer.* The Sweet-smelling Agrimony.

The first of these Sorts is common in the Hedges in many Parts of England, and is the Sort commonly used in Medicine; but should not be wanting in a Garden: It will grow in

almost any Soil or Situation; and is increased by parting the Roots in Autumn, or by sowing the Seeds soon after they are ripe.

The Sweet-smelling Agrimony is by some preferr'd to the common Sort for medicinal Uses; but however it is certainly the most grateful to infuse for pectoral Decoctions, and makes a pleasant Sort of Tea: It is propagated as the common Sort, but requires an open Exposure.

AIR; *Aer*, *Lat* *ἀήρ* of *τῷ αἰὲρ ποῖρ*, because it always flows; or as others, of *ἀήρ* to breathe; or as others, of *τῷ αἰσπερ*, because it bears the Earth.] By *Air* is meant all that fluid expanded Mass of Matter which surrounds our Earth, in which we live and walk, and which we are continually receiving and casting out again by Respiration.

The Substance whereof *Air* consists, may be reduced to two Kinds, *viz.*

1. The Matter of Light or Fire, which is continually flowing into it from the heavenly Bodies.

2. Those numberless Particles, which in Form either of Vapours or dry Exhalations, are raised from the Earth, Water, Minerals, Vegetables, Animals, &c. either by the solar, subterraneous or culinary Fire.

Elementary Air, or *Air* properly so call'd, is a certain subtil, homogeneous elastick Matter, the Basis or fundamental Ingredient of the atmospherical *Air*, and that which gives it the Denomination.

Air therefore may be consider'd in two respects, either as it is an universal Assemblage or *Chaos* of all Kinds of Bodies; or as it is a Body endued with its own proper Qualities.

1. That there is Fire contain'd in all *Air* is demonstrable, in that it is evident, that there is Fire existing in all Bodies; and to this Fire it is that *Air* seems to owe all its Fluidity; and were the *Air* totally divested of that Fire, it is more than probable that it would coalesce into a solid Body; for 'tis found by many Experiments, that the *Air* condenses, and contracts itself so much the more, the less Degree of Warmth it has; and on the contrary, expands it self the more, according as the Heat is greater.

2. In respect of Exhalations, *Air* may be said to be a general Collection of all kinds of Bodies; for there are no Bodies but what Fire will render volatile and disperse into *Air*; even Salts, Sulphurs, and Stones, nay and Gold itself, though the heaviest and most fixed of all Bodies, are convertible into Vapours by a large Burning-glass, and are carried on high.

Those floating Particles thus raised from terrestrial Bodies, are moved and agitated by the fiery Particles divers Ways, and are diffused through the whole Atmosphere.

Of the Matters thus raised in the Atmosphere, those which come from fluid Bodies are properly called *Vapours*, and those from solid or dry ones *Exhalations*.

The Cause of this Volatility and Ascent is the Fire, without which all Things would fall

immediately down towards the Center of the Earth, and remain in eternal Rest.

Thus if the *Air* be full of Vapours, and the Cold succeeds, those Vapours before dispersed are congregated and condensed into Clouds, and thus fall back again into the Form of *Water, Rain, Snow or Hail*.

From the Time of the Entrance of the Spring till Autumn, the Evaporation is constant; but then it begins to fail, and in the Winter ceases, to lay up fresh Matter for the coming Season.

And thus it is that frosty Winters, by congealing the Waters, and by covering the Earth with a Crust, and thus imprisoning the Exhalations, make a fruitful Summer.

And this seems to be the Reason, why in some Countries, where the Winter is severer than ordinary, the Spring is more than ordinary fruitful: For in such Places the Exhalations being pent up a long time, are discharged in the greater Quantity, when the Sun makes them a Passage; whereas under a feebler Cold, the Flux would have been continual, and consequently no great Stock reserv'd for the next Occasion.

This vapourous Matter then being at length received into the Atmosphere, is return'd again in the Form of Rain, a Fore-runner of a cheerful Crop.

As the Sun retires, the Cold succeeds; and thus the Diversity of the Seasons of the Year depends on a Change in the Face of the Crust of the Earth, the Presence of the Air, and the Course of the Sun.

And hence we conceive the Nature of Meteors, which are all either Collections of such Vapours, and Exhalations, or Dispersions thereof.

Collections of Vapours make Clouds, which being farther and farther condensed, turn to Snow, Rain or Hail.

The subtiler Oils are always rising into the Air: Now two Clouds, partly form'd of such Oils, happening to meet and mix, by the Attrition the Oil frequently takes Fire, and hence proceeds Thunder, Lightenings, and other Phenomena; which may be farther promoted by the Disposition of the Clouds to favour the Excitation.

And hence arise great and sudden Alterations in the Air; insomuch that it shall now be intensely hot, and raise the Spirits perhaps to 88 Degrees in a Thermometer; and yet after a Clap of Thunder with a Shower, it shall fall again in a few Minutes no less than 20 or 30 Degrees.

Ice may be, and is form'd even in the Heavens from the intense Cold that frequently prevails there; and the Sun's Rays passing duly through the Ice, have their Force considerably increased; as we see in Burning-glasses made of Ice.

And hence our Degree of Heat may be greatly heightened; as accordingly we observe, that when our Atmosphere is replete with Clouds, provided they are not gross enough to intercept the Rays, our Heat is then most intense and sultry.

It is known that none of these Clouds are above an *English* Mile high; and even the white ones, in fair Weather, are rarely found to be more than three quarters of a Mile, and seldom above half a Mile from the Surface of the Earth, and on very high Mountains the Warmth is inconsiderable.

In effect, our Heat depends more on the Circumstances of the Clouds, and the Bodies that are beneath them, than on all that is above them, taking Sun, Moon, Stars and all.

It is therefore impossible to pronounce what the Degree of Heat will be in any given Place at any Time, even though we know ever so well the Places and Position of the Sun and Planets, with respect to us, since it depends so much upon other variable Things, no ways capable of being ascertained.

The Height or Depth of the *Air* makes a yet farther considerable Alteration therein; for the Exhalations are few of them able to ascend above the Tops of Mountains; and on some Mountains in *Bavaria* it is Winter, and on the other Side Summer at the same Time; so that while this Side is parched with Heat, that lies buried in Snow: And the Inhabitants on one Side of a Mountain have all perished with the Plague, while those of the other Side have remained in perfect Health.

The lower the Place, the closer, denser, and heavier is the *Air*, till at length you arrive at a Depth where the Fire goes out: So that Miners, who go deep, to remedy this Inconvenience, are forc'd to have Recourse to an artificial Wind, raised by the Fall of Waters, to do the Office of the other *Air*.

The *Air* may likewise undergo some Alterations by Means of its Motion: Thus a brisk Wind lessens the Pressure of the incumbent Atmosphere; by which means the subterraneous Air may be enabled to raise the Crust of the Earth, or occasion a shuddering of it: And hence proceeds Mr. *Hawksby's* Observation, that the Barometer sinks very notably when the Wind is raised, or the *Air* agitated about the same Time.

Now considering the *Air* as such a *Chaos* or Assemblage of all Kinds of Bodies, and a *Chaos* so extremely liable to change, it must needs have a great Influence on vegetable Bodies.

In general, the *Air*, as it contains divers Kinds of Exhalations, has a wonderful Effect towards promoting, stopping or altering the Actions of all Bodies on each other: So if pure well-fermented Wine be carried into a Place where the Air is replenish'd with the Fumes of new Wine next fermenting, it will begin to ferment afresh: And from the *Air*, consider'd as before, do arise many astonishing Effects.

The *Air* is every where in continual Motion; for in the stillest Season, when no Wind is stirring, if a Person places himself in a darken'd Room, which only receives the Light in at a little Hole, capable of admitting a single Ray; that Ray, dividing itself, and illuminating the whole Length of the Room, he may perceive every

every Thing, all the external Objects, whose Species are brought in Motion, which is owing to the external Air, which insinuating itself through the Chinks of the Edifice, moves that on the Outside of the Chamber. And hence,

The Mercury in a very large accurate *Barometer* is found to be continually vibrating or leaping up and down, without ever remaining a Moment quiet.

This perpetual Motion of the *Air* is owing to Fire, which acts there on the true, proper *Air*, by means of its native Elasticity.

Others say, the Cause from whence the *Air*, which is compos'd of so many heterogeneous Particles, receives its sudden and continual Motion, is properly the *Æther*, or the subtil and celestial Matter, and from it the *Corpuscula* in the *Air* acquire their Force and Motion; and besides, one Part moves another by the same Means; and by how much smaller the Bodies are, by so much is their Motion the more sudden; and this is done incessantly, tho' we cannot perceive it.

These Particles of *Air* are very light, yet nevertheless they have their Weight, according to their Proportion and Degree of Levity.

The Motion of the *Air*, and consequently its Force and Effect, arise wholly from Fire, by moving all the various Kinds of Particles which are in the *Air*, and performs infinite Operations.

In the extreamest Cold, the *Air* scarce acts at all, but is contracted within itself; but when warm expands again, and agitates other Bodies; consequently as the Degrees of Heat are infinite, so must the Actions and Effects of the *Air* be: Add, that as the Fire acts on all the *Corpuscles* that are in the *Air*, and these are infinite, 'tis evident that all the Actions thereof are indefinite.

3. *Air* consider'd in itself, or that properly call'd *Air*.

Besides the Fire and Exhalations contain'd in the circum-ambient Atmosphere, there is a third Matter, which is what we properly mean by *Air*.

To define the Nature of it would be extremely difficult, inasmuch as its intimate Affections are unknown to us: All we know is,

1. That *Air* is naturally an homogeneous similar Body.
2. That it is fluid.
3. That it is heavy.
4. That it is elastick.
5. That it rarefies by Fire, and contracts by Cold.
6. That 'tis compressible by a Weight laid thereon, and rises, and restores itself upon a Removal of the same: All which Circumstances should incline it to coalesce into a Solid, if Fire were wanting.

1. *Air* is divided into *Real*, and *Permanent*, and *Apparent* or *Transient*.

Real Air is not reducible by any Compression or Condensation, or the like, into any Substance besides *Air*.

Transient Air is the contrary of the former, and by Cold, &c. may be condensed in-

to original Water: the Difference between *permanent* and *transient Air* amounts to the same as that between Vapour and Exhalation; the one, *e. g.* being dry, and the other moist.

Hence, as Sir *Isaac Newton* says, it is, that as the Particles of permanent *Air* are grosser, and arise from denser Bodies than those of transient *Air* or Vapour, *True Air* is more pondrous than Vapour, and a moist Atmosphere lighter than a dry one.

But this *real Air* no where consists in its Purity; but that *Air* which concerns us, and the Properties and Effects of which are chiefly to be consider'd, is, that which has been before treated on and describ'd, which Mr. *Boyle* acknowledges to be the most heterogeneous Body in the Universe; and Dr. *Boerhaave* shews to be an universal *Chaos* and Colluvies of all the Kinds of created Bodies in the Universe, and in which may be found whatever Fire can volatilize.

2. That the *Air* is *fluid*, appears from the easy Passage it affords to Bodies through it; as in the Propagation of Sounds, Smells, and other Effluvia: For these Things shew it a Body that gives Way to any Force impress'd; and in yielding are easily moved among themselves, which are the Properties of a Fluid: So that scarce any Body will call in Question, whether *Air* be a *Fluid*, and thence being always in Motion, and always moving other Bodies; for no Surface of any Liquor that is contiguous to the *Air*, can be at rest.

3. As to the *Gravity* or *Heaviness* of the *Air*, that is likewise easily prov'd; for that the *Air* is heavy, follows from its being a Body, Weight being an essential Property of Matter.

Sense and Experiment sufficiently prove this; for, if a Person lay his Hand upon an open Vessel plac'd on an Air Pump, and the *Air* be exhausted, he will sensibly feel the Load of the incumbent Atmosphere to increase, and press upon the upper Part of his Hand as the *Air* is exhausting.

In like manner, a hollow Sphere of five or six Inches Diameter, divided into two Segments exactly fitting each other, after the *Air* is exhausted out of them, are pressed together with a Force equal to an hundred Pounds Weight, and require the Strength of two strong Persons to pull them asunder; which as soon as ever the *Air* is let into them again, will fall asunder by the meer Weight of the under Hemisphere.

The Elements of all Bodies are as heavy as the Elements of Gold, and Variety of Bodies, in Point of Weight, arises only from the particular Surface which those Particles acquire in the Contexture: Thus, if Gold be beaten into very thin Leaves, it will swim in Water, or be carried about by the *Air*; so that it does not appear, that the least Particles of *Air* are more porous than those of Gold.

Again, that the *Air* has Gravity is demonstrable, in that it may actually be weigh'd; and a Bladder blown full of *Air*, weighs more than when it was empty.

Mr

Mr. Boyle found that a Lamb's Bladder containing about two Thirds of a Pint, and blown up, and well dry'd, lost about a Grain and one Eighth when it was prick'd, and the Air let out.

Mr. Gravesende found, that the Air in a Glass Ball of about 283 Inches Capacity, weigh'd an hundred Grains; and according to Burcher de Volder, a Cubit Foot of Air is in Weight one Ounce and twenty-seven Grains.

Mr. Boyle has computed, that the Weight of any Quantity of Air, near the Surface of the Earth, is to Water as 1 to 1000; and Dr. Halley, as 1 to 800; and Mr. Hawksby, as 1 to 885, and the Gravity of the same Quantity of Air to the same Quantity of Mercury, as 1 to 10800.

As to the Use and Effects of this Pressure of the Air, the Weight of the whole incumbent Air is such as enables it to sustain the Mercury in the Torrecellian Tube to the Height of 28 Inches, and Water to that of 32 Feet: But the Weight or Gravity of the Air is continually varying, according to the different Degree of Heat and Cold; and Experiments made in different Places necessarily vary in regard of the different Heights of the Places, and the Differences of Air arising therefrom: And so the Mercury in a Barometer is found to descend a fourth Part of an Inch for every 100 Foot of Ascent.

Air therefore may be consider'd as an universal Operculum or Cover, which by its Weight keeps all terrestrial Bodies down, and hinders them from flying off.

4. The Air is elastick. Elasticity is a Quality whereby a Body yields to any external Impression, by contracting itself into less Compass; and upon removing or diminishing the impressing Power, returns to its former Space or Figure: And by this Quality, the Air is distinguish'd from all other Bodies in the Atmosphere; neither Fire nor Exhalations appearing to be elastick, at least in any notable Degree.

That there is such a Quality in the Air is evident from innumerable Experiments; and this Property is inseparable from it: A Bladder full blown being squeez'd in the Hand, the included Air may be sensibly perceived to resist the Touch; so that upon ceasing to compress it, the Cavities or Impressions which were made in its Surface are immediately expanded again and filled up.

Also thin Glass Bubbles, or Bladders full of Air, and exactly closed and put into the Receiver of an Air Pump, the Air being exhausted out of the Receiver, the Glass Bubbles fly in Pieces by the Force of the Air included in them.

Again, if a Bladder quite flaccid, having but a very little Quantity of Air included in it, be put into a Receiver, and the Air exhausted out of the Receiver, the Bladder will swell as the Air is exhausted, till it be quite full.

This Nisus, or Endeavour to expand itself, is always exerted by every Particle of Air; and thus strives against an equal Endeavour of

the ambient Particles of Air: But as the Resistance happens by any means to be weaken'd, it immediately diffuses itself into a vast Extent.

This Power or Property of the Air does not seem to have any Limits assigned it. Mr. Boyle, by several Experiments, dilated it first into 9 times its Space, then into 31, then into 60, then into 150; afterwards it was brought to dilate into 8000 times its Space, then into 10000, and at last into 13679 times its Space; and all by its own expansive Force, without any Help of Fire.

From these Experiments, and many others, it appears, that the Air we breathe near the Surface of the Earth is compress'd by its own Weight into at least 13679 Parts of the Space it would possess in Vacuo: And if the same Air be condens'd by Art, the Space it will occupy, when most dilated, will be as 505000 to 1, to that which it possesses when condens'd: And Dr. Wallis suggests, that we are far from knowing the utmost it is capable of.

Nor does this Power appear capable by any Means to be destroy'd or diminish'd: For Mr. Boyle made several Experiments to discover how long Air, brought to the greatest Degree of Expansion he could reduce it to in his Air Pump, would retain its Spring, and could never observe any sensible Diminution; altho' the Air was clogg'd some Months with a Weight that one would admire how it should support one Moment.

It is, indeed, a wonderful Property in Air, that it should be capable of being contracted and extended infinitely; but, as has been said, it does not appear, by all the Experiments yet try'd, that there are any Limits of its Compression or Expansion; but still by the Addition of a new Weight it will contract farther, and by taking the Weight away will expand farther.

This wonderful Property has given Occasion to several learned Persons to examine into the Structure of the Air, or Figure of its Particles, and to form some Conception or Idea as to the Structure of it.

Mr. Boyle conceives the Air to be a Congeries of minute *Flosculi*, all springy, expansible, and contractible, and supposes it to derive its elastick Force from its Structure, or the Form of these *Flosculi*, which he resembles to Fleeces of Wool: Which if several Fleeces be laid one upon another, and they be compress'd by the Hand, or any Weight, have an elastick Force, and upon the Removal of the Pressure, will rise again.

Others resemble the Particles of the Air to the Springs of Watches coil'd up, and endeavouring to restore themselves.

Others to very slender Wires of different Substances, Consistences, Lengths, and Thicknesses; in greater Curves, or less; nearer to, or remoter from each other, &c. yet all continuing springy, expansible and compressible.

Others compare them to thin shavings of different Kinds of Wood, various in their Length, Breadth and Thickness.

Sir *Isaac Newton* considers *Air*, as to the Effects alone, without concerning himself as to the Figure of its Particles, and observes, that these aerial Particles exert certain new Powers in approaching nearer each other, whereby they mutually endeavour to recede or fly from each other: So that the farther they are apart, this Force does act the less; and the stronger, the nearer: And he brings the Instance of *Air* and *Vapours*, which seem to discover some such repelling Power, as an Argument of the same Power's being found in other Bodies.

Tho' either of these Hypotheses may be sufficient, yet the former assumes or takes the more for granted; since it supposes the *Air* to be fleecy; whereas, according to the latter, the Particles of the *Air* may be of any Figure at Pleasure, provided they are but allow'd the *Vis recedendi*; but some who have most accurately and ingenuously consider'd it, have confessed, that they do not know what the *Air* is.

5. *Air* rarefies by Fire, and contracts by Cold.

The colder the *Air* is, the less Space it takes up; and, on the contrary, the warmer the *Air* is it possesses, the larger the Space; and so Cooling and Compression have the same Effects upon *Air*; and so Cold and Compression keep Pace with one another.

The same holds of warming and diminishing of Weight, or Heat and Expansion, which go Hand in Hand.

And to the same elastick Power before-mention'd, and its being expanded by Heat, it is owing, that *Air* inclosed in Glass Vessels, at a time when it is much condensed, when it afterwards comes to expand by a farther Degree of Heat, frequently bursts the Bottles.

All those Persons who have travelled the highest Mountains, agree, that the *Air* is colder in high Places than near the Surface of the Earth; and, of Consequence, the *Air* there must contract itself more in Proportion; yet notwithstanding the *Air* of the same Places consider'd, as it is press'd with a less Load of incumbent *Air*, must expand itself more. And hence it is, that Barometrical Experiments made on the Tops of the highest Mountains, are frequently very wavering and precarious.

6. *Air* is compressible by a Weight laid thereon, and rises and restores itself upon a Removal of the same. This properly has been sufficiently shewn by what has been said before, and especially under the Head of Elasticity: Wherefore, having considered the Properties of *Air*, I shall take Notice of some of its Operations and Effects as to the Business of Vegetation.

Air, by being heavy and fluid, invests the whole Earth, and presses all the Bodies thereon with a great Force, equal to what they would sustain from the Pressure of a Column of 29 Inches Depth of Mercury, or 32 Feet of Water, and constringes and binds them down with a Force amounting, according to the Computation of Mr. *Paschal*, to 2232 Pounds Weight upon every square Foot, or upwards of 15 Pounds

upon every square Inch. Hence it prevents, e. g. the arterial Vessels of Plants and Animals from being too much distended by the *Impetus* of the circulating Juices, or by the elastick Force of the *Air* so plentifully lodg'd in the Blood of one, and the Sap of the other. For,

The *Air* presses equally every Way, as is confirmed in what we observe of soft Bodies sustaining this Pressure without any Change of Figure, and brittle Bodies without their breaking.

Air is a principal Cause of the Vegetation of Plants, an Instance of which we have from Mr. *Ray*, in the *Philosophical Transactions*, of Lettice-Seed, that was sown in the Glass Receiver of the *Air Pump*, which was exhausted and clear'd from all *Air*, which grew not at all in eight Days Time; whereas some of the same Seed that was sown at the same Time in the open *Air*, was risen to the Height of an Inch and an half in that Time; but the *Air* being let into the empty Receiver, the Seed grew up to the Height of two or three Inches in the Space of one Week.

Another Instance of the Usefulness of the *Air* in Vegetation, is the *Sedum*, which will push out Roots without Earth and Water, and live for several Months: And some Sorts of Aloes, if hung up in a Room intirely secur'd from Frosts, will remain fresh for some Years, tho' they will sensibly lose in their Weight.

Air is capable of penetrating the porous and spongy Parts of Plants, and being there contracted, and dilating itself again.

The *Air* operates also within the Bowels of the Earth, and by its Subtlety perspiring thro' the Pores, assists in the Rarefaction of the Crudities of the Earth, and in the dispelling all superfluous Moisture, entering into the very Pores and Veins of the Trees, Plants, Herbs, &c. carrying along with it those Salts contain'd either in itself, or lodged in the Earth; which Salts or Juices are alter'd according to the several Figures or Dimensions of the different Strainers or Vessels of those several Plants which grow upon the same Spot of Earth, which is so impregnated with these Salts: And thence those Varieties in Taste and Smell proceed, notwithstanding they all receive their Nourishment from the same Stock that is lodg'd in the Earth.

The *Air* also affects the Branches, Leaves, and Flowers of Trees, Plants and Herbs, entering and perspiring thro' them, and even through the Bark and Body of the Tree; and by the same Kind of Subtlety it does, by its refreshing Breezes, moderate the Intensity of the Sun-beams, cooling, clearing, blowing, opening and extending all the Offspring of Nature.

The *Air* fixes and insinuates its aerial Substance into the liquid Sap of Vegetables, and as all the Agitations in Nature proceed from the Contrariety of Parts inhabiting together; so, in this aerial and liquid Substances being mix'd, cause this Agitation and Motion in Vegetables, or, more properly, set it all into a Ferment (whether it be in the Roots or in the Stem)

and rises by Cooperation of the Sun (which is the third Agent in Vegetation) up to the Top of a Tree, &c. as Liquids rise by Fire to the Top of the containing Vessel.

This *Air*, we find, produces a vibratory Motion in several Bodies, and particularly in Plants; the *Air* Vessels thereof do the Office of Lungs: For the *Air* contain'd in them, sometimes contracting and sometimes expanding, according as the Heat is increas'd or diminished, presses the Vessels, and eases them again by Turns, and thus promotes a Circulation of their Juices, which could scarce be otherwise effected.

Air, says the learned Mr. Hales, is a fine elastick Fluid, with Particles of very different Natures floating in it, whereby it is admirably fitted by the great Author of Nature to be the Breath of Life of Vegetables as well as Animals, without which they can no more live nor thrive than Animals can.

As a Proof of the great Quantities of *Air* in Vegetables, he refers to the third Chapter of his excellent Treatise of *Vegetable Statics*, where, he says, in the Experiments on *Vines*, the great Quantity of *Air* was visible, which was continually ascending through the *Sap* in the Tubes; which manifestly shews what Plenty of it is taken in by Vegetables, and is perspired off with the *Sap* through the Leaves.

He adds several Experiments, as to an *Apple-Branch*, *Apricot-Branch*, *Birch*, and other Plants, to prove the same Thing.

And Dr. Grew has observ'd, that the Pores are so large in the Trunks of some Plants; as in the better Sort of thick walking Canes, that they are visible to a good Eye without a Glass; but, with a Glass, the Cane seems as if stuck at top full of Holes with great Pins, so large as very well to resemble the Pores of the Skin in the Ends of the Fingers, and Ball of the Hand.

In the Leaves of Pines, they are likewise through a Glass a very elegant Shew, standing almost exactly in Rank and File through the Length of the Leaves.

Whence it may be thought probable, that the *Air* freely enters Plants, not only with the principal Fund of Nourishment by the Roots, but also through the Surface of their Trunks and Leaves, especially at Night, when they are changed from a perspiring, to a strongly imbibing State.

Mr. Hales likewise tells us, that, in all those Experiments that he try'd to this Purpose, he found, that the *Air* entred very slowly at the Bark of young Shoots and Branches, but much more freely through old Bark; and that, in different Kind of Trees, it had different Degrees of more or less free Entrance.

And likewise, that there is some *Air* both in an elastick and unelastick State, mix'd with the Earth (which may well enter the Roots with the Nourishment) he found by several Experiments, which he gives in the before-mentioned Treatise.

The excellent Mr. Boyle, in making many Experiments on the *Air*, among other Discoveries, found, that a good Quantity of *Air*

was producible from Vegetables, by putting Grapes, Plumbs, Gooseberries, Peas, and several other Sorts of Fruits and Grains into exhausted and unexhausted Receivers, where they continued for several Days emitting great Quantities of *Air*.

This put the curious Mr. Hales upon farther Researches to find out what Proportion of *Air* he could obtain out of the different Vegetables in which it was lodg'd and incorporated, which he performed by divers *chimio-statical* Experiments, which he gives in many Instances in his Treatise of Analysis of the *Air*, plainly shewing in what Manner he performed them, and the Events of them.

That, from half a Cubick Inch, or 135 Grains of *Heart of Oak*, fresh cut from a growing Tree, there were 108 Cubick Inches of *Air* generated, which is a Quantity equal to 216 times the Bulk of the Piece of Oak; that the Weight of it was above 30 Grains, one Quarter Part of the Weight of 135 Grains.

And he adds, that he took the like Quantity of thin Shavings from the same Piece of Oak, and dry'd them at some Distance from a gentle Fire for 24 Hours; in which Time they evaporated 44 Grains of Moisture; which 44 Grains deducted from 135 Grains, there remain 91 Grains for the solid Part of the Oak: Then 30 Grains will be one Third of the Weight of the solid Part of the Oak.

He gives another Experiment of *Indian Wheat*, which grew in his own Garden, that he took 388 Grains of it, when it was not come to its full Maturity, and that there were generated from it 270 Cubick Inches of *Air*; the Weight of which *Air* was 77 Grains, viz. one Fourth of the Weight of the Wheat.

And again, that a Cubick Inch, or 318 Grains of Peas generated 396 Cubick Inches of *Air*, or 113 Grains, i. e. something more than one Third of the Weight of the Peas.

And again, that, from one Ounce, or 437 Grains of Mustard-Seed, 270 Cubick Inches of *Air* were generated, or 77 Grains, which is more than one Sixth Part of the Ounce Weight.

He likewise adds, that there is a great Plenty of *Air* incorporated into the Substance of Vegetables, which, by the Action of Fermentation, is rouz'd into an elastick State, as is evident from these Experiments following.

On the second Day of *March*, he poured 42 Cubick Inches of Ale from the Ton, which had been there set to ferment 34 Hours before into a Bolt-head; and, from that Time, to the 9th of *June*, it generated 639 Cubick Inches of *Air*, with a very unequal Progression, more or less as the Weather was warm, cool, or cold, and sometimes upon a Change from warm to cool, it reformed *Air*, in all 32 Cubick Inches.

From the 2d of *March* to the 16th of *April* 12 Cubick Inches of *Malaga Raisins*, with 18 Cubick Inches of Water, generated 411 Cubick Inches of *Air*; and then again, it reformed 35 Cubick Inches in two or three cold Days:

From

From the 21st of *April* to the 16th of *May*, it generated 78 Cubick Inches; after which, the 9th of *June*, it continued in a resorbing State, so as to resorb 13 Cubick Inches: That there was at that Season many hot Days, with much Thunder and Lightning, which destroys the Elasticity of the *Air*; so there were generated in all 489 Cubick Inches, of which 48 were absorb'd. The Liquor was at last vapid.

On the 10th of *August* 26 Cubick Inches of Apples being marsh'd, they generated 968 Cubick Inches of *Air* in 13 Days time, which is a Quantity equal to 48 times their Bulk; after which they did resorb a Quantity equal to their Bulk, in three or four Days, notwithstanding the Weather was then very hot; after which Time they were stationary for many Days, neither generating nor absorbing.

From which before-mention'd Experiments on *Raisins* and *Ale*, the ingenious Author concludes, that Wine and Ale do not turn vapid in warm Weather by imbibing the *Air*, but by fermenting and generating too much; by which Means they are deprived of their enlivening Principle the *Air*: For which Reason these Liquors are best preserved in cool Cellars, whereby this active invigorating Principle is kept within due Bounds, which when they exceed, Wines are upon the Fret, and are in Danger of being spoil'd.

Upon these and many other Experiments, which the learned Author has given in his aforesaid Treatise, he observes, that this *Air* which arises in so great Quantities from fermenting and dissolving Vegetables, is *true permanent Air*, which is certain, by its continuing in the same expanded and elastick State for many Weeks and Months, which expanded, watery Vapours will not do, but soon condense when cold.

Upon the whole, he concludes, that *Air* abounds in vegetable Substances, and bears a considerable Part in them: And, if all the Parts of Matter were only endowed with a strongly attracting Power, whole Nature would then immediately become one unactive cohering Lump.

Wherefore it was absolutely necessary, in order to the actuating this vast Mass of attracting Matter, that there should be every where mix'd with it a due Proportion of strongly repelling elastick Particles, which might enliven the whole Mass, by the incessant Action between them and the attracting Particles.

And since these elastick Particles are continually in great abundance reduced by the Power of the strong Attracters, from an elastick to a fix'd State; it was therefore necessary that these Particles should be endued with a Property of resuming their elastick State whenever they were disengaged from that Mass in which they were fix'd, that thereby this beautiful Frame of Things might be maintain'd in a continual Round of the Production and Dissolution of Vegetables as well as animal Bodies.

The *Air* is very instrumental in the Production and Growth of Vegetables, both by in-

vigorating their several Juices, while in an elastick active State, and also by greatly contributing in a fix'd State, to the Union and firm Connexion of the several constituent Parts of those Bodies, viz. their *Water*, *Fire*, *Salt*, and *Earth*.

To conclude, by reason of those Properties of the *Air* before-mentioned, it is very serviceable to Vegetables, in that it blows up and breaks open the Clouds, those Treasures of Rain, which fertilizes the vegetable Kind.

The *Air* also helps to waste away or disperse those foggy humid Vapours which arise from the Earth, and would otherwise stagnate and poison the whole Face of the Earth.

The *Air*, by the Assistance of the *Sun*, assumes and sublimates those Vapours into the upper Regions; and these foggy humid Vapours are, by this Sublimation, and the coercive Power of the *Air* and *Sun*, rarefied and made of second Use in Vegetation.

And, on the contrary, to the benign Quality of the *Air*, which is so many Ways subservient to Vegetables; so it is also sometimes, and upon some Accounts, injurious and pernicious to them; not only to the lignous, herbaceous and flowery Parts above, but also to the Roots and Fibres below: For in that the *Air* penetrates into the Earth, it is easy to be concluded, that a dry, husky, scorching *Air* may be very prejudicial to the tender Fibres of new-planted Trees.

It may be likewise suppos'd, that all Bodies of Earth are more or less capable of imbibing the fluid *Air*, and of attracting such Salts as either the *Air* can give, or the *Earth* is capable of receiving.

ALA, is the Hollow of a Stalk, which either the Leaf, or the Pedicle of the Leaf, makes with the Stalk or Branches; or it is that hollow Turning or Sinus plac'd between the Stalk or Branch and Leaf, from whence a new Offspring is wont to put forth, which the *French* call, *Aisselles des Plantes*. Sometimes it is taken for a little Branch; as when they say, a Stock or Stem, arm'd with many *Ale*, because Branches grow to the Stock as so many Wings.

ALÆ is also used to signify those Petalæ of papilionaceous Flowers plac'd between the *Vexillum* and the *Carina*, which the *French* call, *Les ailes des Fleurs legumineuses*.

ALÆ is also used for those extreme slender membranaceous Parts of certain Seeds; as in the *Bignonia*, *Plumeria*, the Fruit of the Maple, &c. which the *French* call *Semences Ailées*. Again,

ALÆ is used for those foliaceous Membranes which run the whole Length of the Stem; whence it is called, *Caulis Alatus*, a winged Stem; in *French*, *Tige Ailée*.

ALABASTRA, are those green herbaceous Leaves that encompass Flowers. *Jungius* explains *Alabastrum* to be the Globe or roundish Bud, that is but just peeping out.

ALA-

ALATERNOIDES; [*Alaternus* and *ἄλτερν*, Gr. Form or Shape;] a Sort of *Alaternus*.

The Characters are;

This differs from the Alaternus, in having three Seeds join'd together, in the manner of the Tithymalus, (or Spurge) whereas the Alaternus has three Seeds inclos'd with one common Covering, and appears to be a single Berry till it is opened.

There are, at present, but three Species of this Plant known in the English Gardens, viz.

1. ALATERNOIDES, *Africana, Lauri serratæ folio. Com. præl.* The African *Alaternoides*, with serrated Bay-leaves.

2. ALATERNOIDES, *Africana, Ericæ foliis, floribus albicantibus & muscosis. H. Amst.* The African *Alaternoides*, with Leaves like the Heath, and white Flowers.

3. ALATERNOIDES, *Africana, Telephii, legitimi Imperati folio, flore viridi. H. Amst.* The African *Alaternoides*, with Leaves like the true Orpine of Imperatus, and green Flowers.

The first of these Sorts has been an old Inhabitant in the English Gardens, and is still continu'd by Persons that are curious in Collections of Plants; but it hath no very great Beauty, being with great Difficulty reducible to any tolerable Shape, and the Flowers (which but seldom appear with us) afford no great Prospect, being very small, and of a greenish yellow Colour.

This is easily increas'd by planting Cuttings in any of the Summer Months, in a shady Border, which do readily take Root, but must be potted and hous'd in Winter with Myrtles, &c.

The second Sort has been lately introduc'd amongst us, and is, at present rare in England; this is a very beautiful Plant, producing large Tufts of fine white Flowers, in November, December, and January, which is a Season that few Plants are in Flower in the Green-house.

This is thought pretty difficult to increase; but I planted only six Cuttings of it in a Pot of light fresh Earth, and plung'd the Pot into a cool Bed of Tanner's Bark, in September; and five of the six Cuttings grew, and made fine Plants.

And I believe that to be the best Season to plant the Cuttings, it being the Time when the Plant begins to shoot, and prepare for flowering.

This must be hous'd, and kept in the same Green-house with Oranges, &c.

The third Sort is yet more rare than the second, and is in very few Gardens at present: This is increas'd by planting Cuttings in June or July, keeping them shaded and water'd till they have taken Root: At Michaelmas they must be potted, and hous'd with the second Sort, but this is not near so fine a Plant as that is.

ALATERNUS; [call'd *ἑλαιοπριον*, as tho' of *ελαια*, an Olive, and *πριον*, an Ilex] or Ever-green Privet.

This Tree, Mr. Bradley says, is distinguish'd from the *Phillyrea*, only by the Leaves of this being plac'd alternately upon the Branches; whereas those of the *Phillyrea* are produc'd by Pairs opposite to each other: But this is not the real Difference, as he might have known had he but examin'd the Fruit of the two Trees, or look'd into any of the modern Botanick Writers, who have distinguish'd the *Alaternus* from the *Phillyrea*, because it hath three Seeds inclos'd in each Berry, whereas the *Phillyrea* has but one.

We have six or seven Varieties of this Tree in the English Gardens, viz.

2. ALATERNUS, 1. *Clus. Hisp.* This is commonly call'd, The Broad-leav'd, or Common *Phillyrea*.

2. ALATERNUS, 1. *Clusii foliis ex luteo variegatis.* The blotch'd *Phillyrea*, vulgô.

3. ALATERNUS, seu *Phylica, foliis angustioribus & profundius serratis. H. L.* The Narrow-leav'd *Alaternus*, with saw'd Edges.

4. ALATERNUS, seu *Phylica aurea, five foliis ex luteo variegatis.* The Dutch Gold-edg'd *Alaternus*, vulgô.

5. ALATERNUS, seu *Phylica argentea, five foliis ex albo variegatis.* The Silver *Phillyrea*, vulgô.

6. ALATERNUS, *minori folio. Tourn.* The Small-leav'd *Alaternus*.

The two first Sorts are very common in most old Gardens, and were formerly in much Request to make Ever-green Hedges, but are of late almost wholly dilus'd for that Purpose: The Branches are very apt to shoot strong, and require often clipping in Summer, to keep them handsome, and their being subject to be displac'd by strong Winds, or great Snows, together with their being liable to suffer in hard Winters, have justly excluded them from fine Gardens.

However, these, with the third and sixth Sorts, are very proper for Wildernesses of Ever-greens, or to plant in Clumps, where, by the Diversity of their Leaves, and different Shades of Green, they very much add to the Beauty of such Plantations.

The three first Sorts will grow to the Height of sixteen or eighteen Feet, and, if suffer'd to grow without clipping, are very hardy (especially if they grow close together, or amongst other Trees) which will prevent the Frost from piercing the Bark of the Stems, which is often the Cause of their Destruction.

The fourth and fifth Sorts are tenderer than any of the other, and require some Shelter in hard Weather, or are planted against warm Walls in Court-yards, &c. to cover them; where, if they are well kept, and not suffer'd to grow from the Walls, they afford an agreeable Prospect.

These Sorts are all increas'd, by laying down the young Branches in the Spring; which in one Year's Time will have taken Root, and may be then transplanted out either into a Nursery, or in the Places where they are to remain. These Trees delight most in a light, dry,

dry, sandy, stony Soil, in which; tho' they do not shoot so strong as in a moist rich Earth, yet are they less subject to be hurt in Winter.

ALCEA; [*Ἀλκία*, of *ἰσχύς*, *Gr.* Strength.] Vervain Mallow.

The Characters are;

It bath the whole Habit of the Mallow; or Althæa; but differs from both, in having its Leaves deeply divided.

This is a common Plant in the Fields; and although sometimes used in Physick, yet is seldom cultivated in Gardens, except in those curious for botanick Collections, in which Gardens there are several Varieties; but as they are rarely cultivated in any other Gardens, and are easily propagated by any that are curious, by sowing their Seeds in the Spring in almost any Soil or Situation, I shall take no farther Notice of them.

ALCHIMILLA; [so call'd, because celebrated by Alchymists] Ladies Mantle.

The Characters are;

The Leaves are serrated; the Cup of the Flower is divided into eight Segments, which are expanded in Form of a Star: The Flowers are collected into Bunches upon the Tops of the Stalks; the Seed-vessels contain, for the most Part, two Seeds in each.

The Species are;

1. **ALCHIMILLA**; *vulgaris*. C. B. Common Ladies Mantle.

2. **ALCHIMILLA**; *Alpina, pubescens, minor*. H. R. Par. The lesser woolly Ladies Mantle:

3. **ALCHIMILLA**; *Alpina, quinquefolia folia subtus argenteo*. Tourn. The Alpine Five-leav'd Ladies Mantle, with the under Part of the Leaves white.

The first Sort is a Plant sometimes used in Physick, and is gathered frequently in moist Meadows, at some Distance from London. This may be kept in a Garden, if planted in a moist Soil, and is increas'd by parting the Roots.

The second Sort is a much less Plant than the first, and is woolly or soft to the Touch; but this Plant, when cultivated in a good Soil, will grow to be almost as big as the first.

The third Sort is found wild in Westmorland, and other northern Parts of England: This, with the two former, are preserv'd in curious botanick Gardens; but as there is little Beauty in them, they are seldom planted in Gardens for Pleasure: They are all propagated by parting their Roots, or sowing their Seeds soon after they are ripe.

ALDER-TREE; *vide* *Alnus*.

ALESANDER, or ALEXANDER; *vide* *Smyrnum*.

ALKEKENGİ; Winter Cherry.

The Characters are;

It bath a Flower which consists of one Leaf, and is expanded at the Top, but of a pentagonal

Figure: The Fruit (which is about the Bigness of a Cherry) is inclos'd in the Cup of the Flower, which swells over it in Form of a Bladder.

There are several Varieties of this Plant cultivated by the curious Botanists, but there is but one of them that is either useful or ornamental, which is the *Alkekengi Officinarium*, Tourn. or the common medicinal Winter Cherry.

This Plant produces round red Fruit, about the Size of a large Cherry; which is inclos'd in a small Bladder, which, in Autumn, changes to a reddish Colour, and opens, and shews its beautiful red Fruit, which continues till November, or sometimes later, before it falls off; for which 'tis chiefly kept in Gardens: It is very apt to creep far under-ground, by which it soon spreads over a large Spot of Ground, therefore should be confin'd in Pots; which, if set in the Shade, and frequently water'd, will very much add to its Fruitfulness; for when the Roots have Liberty, they spend themselves in spreading, and become less fruitful than when confin'd in Pots.

ALLELUJAH; *vide* *Oxys*.

ALLIARIA; Sauce alone, or Jack by the Hedge; *vide* *Hesperis*.

ALLIUM; [of *ἀλλοω*, *Gr.* to avoid or shun, because many shun the Smell of it.] Garlick.

The Characters are;

It bath a bulbous Root consisting of many small Tubercles included in the Coverings (or Coats) thereof: The Leaves are plain; the Flowers consist of six Leaves, which are form'd into a Corymbus upon the Top of the Stalks: The Flowers are succeeded by subrotund Fruit, which are divided into three Cells, in which are contained roundish Seeds.

There are several Varieties of this Plant, which differ in their Leaves, manner of Flowering, Shape and Size of their Bulbs, &c. but there are not above two or three Sorts which are cultivated for Use, *viz.*

1. **ALLIUM**, *sativum*. C. B. The Common or Manur'd Garlick.

2. **ALLIUM**, *sativum, alterum, sive Allioprasum, caulis summo circumvoluto*. C. B. The Rocambole.

3. **ALLIUM**, *sylvestre latifolium*. C. B. Ramson's; *vulgô*.

The two first Species are easily propagated by planting the Cloves, or small Bulbs, in August or September, in Beds about four or five Inches Distance from each other, keeping them clean from Weeds. About the Beginning of June the Leaves should be tied in Knots, to prevent the Spindling, or running to Seed, which will greatly enlarge the Bulb: In the Middle of July the Leaves will begin to wither and decay, at which Time they should be taken out of the Ground, and hang'd up in a dry Room, to prevent their rotting; and may be thus preserv'd for Winter Use.

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The third Sort was formerly in greater Esteem than at present, it being rarely cultivated in Gardens, but is found wild in moist shady Places in many Parts of *England*; and may be cultivated by planting the Roots in a moist shady Border at almost any Time of the Year; but the best Season is in *July*, just as the green Leaves are decaying.

ALMOND-TREE; *vide* Amygdalus.

ALMOND DWARF; *vide* Perfica.

ALNUS, [so call'd; *quod alatur amne*, *Id. i. e.* because nourish'd by a River.] The Alder-Tree.

The Characters are;

It hath Leaves resembling those of the Hazel: The Male Flowers (or Katkins) are produc'd at remote Distances from the Fruit, on the same Tree; the Fruit is squamose, and of a conical Figure.

There are three Species of this Tree in *England*, viz.

1. ALNUS; *rotundifolia, glutinosa, viridis*. C. B. The Common or Round-leav'd Alder.

2. ALNUS; *folio oblongo, viridi*. C. B. The Long-leav'd Alder.

3. ALNUS; *vulgaris, sub-conis ligulis membranaceis rubris donata*. Raii. Syn. Ed. 3. The Scarlet Alder.

This Sort was found in a Meadow near *Long-leet*, by Mr. *Brewer*, some Years since; but it is a Matter of Doubt, whether it is a distinct Species, or some accidental Variety.

These Trees delight in a very moist Soil, where few other Trees will thrive, and is a great Improvement to such Lands: They are propagated either by Layers, or planting of Truncheons about three Feet in Length, in *February*, or the Beginning of *March*, which should be sharpen'd at one End, and the Ground loosened with an Instrument before they are thrust into it, lest, by the Hardness of the Soil, the Bark should be torn off, which may occasion their Miscarriage. They should be thrust into the Earth, at least, two Feet, to prevent their being blown out of the Ground by strong Winds.

If you raise them by laying down the Branches, it must be perform'd in *February* or *March*; and, by the *February* following, they will have taken Roots sufficient to be transplanted out; which must be done, by digging a Hole, and loosening the Earth in the Place where each Plant is to stand, planting the young Tree at least a Foot and a half deep, cutting off the Top to about nine Inches above the Surface, which will occasion them to shoot out many Branches.

The Distance these Trees should be plac'd, (if design'd for a Coppice) is six Feet square; and, if the small lateral Shoots are taken off in the Spring, it will very much strengthen your upright Poles, provided you leave a few small Shoots at Distances upon the Body thereof to detain the Sap for the Increase of its Bulk.

These Trees may be also planted on the Sides of Brooks (as is usual for Willows) where they will thrive exceedingly, and may be cut for Poles every third or fourth Year. This Wood is in great Request with the Turners, and will endure a long Time underground, or to be laid in Water.

ALNUS, NIGRA BACCIFERA; *vide* Frangula.

ALOE, Gr. [*Ἄλνδ*.]

The Characters are;

The Leaves are thick and succulent, and, for the most Part, beset with Spines on the Edges: The Flower consists of one Leaf, is tubulous, and cut into six Segments at the Top, like the Hyacinth: The Fruit is oblong and cylindrical, which is divided into three Cells, in which are contain'd flat, and, for the most Part, semicircular Seeds.

There is a great Variety of this Plant in the curious Gardens of Botany in *England*, which are Natives both of the East and West-Indies; but most of the curious Sorts were brought from the Cape of Good Hope. I shall first enumerate their Kinds, and then proceed to their Culture.

1. ALOE, *Americana muricata*. J. B. The common large American Aloe.

2. ALOE, *Americana minor*. Mant. The lesser American Aloe.

3. ALOE, *Americana ex Vera Cruce, foliis angustioribus, minus glaucis*. H. Beaum. The Narrow-leav'd Aloe from *Vera Cruce*.

4. ALOE, *Americana ex Vera Cruce, foliis latioribus & glaucis*. H. H. The Broad-leav'd Aloe from *Vera Cruce*.

5. ALOE, *Americana folio viridi rigidissimo, fatido, Piet. dista indigenis*. H. Beaum. The broad Green-leav'd Aloe from *Curasso*, with black Spines.

6. ALOE, *Americana folio viridi serrato*, Silk Grass, *dista*. An. Aloe Americana, folio Draconis serrato. Com. Præl. The American Aloe, with green serrated Leaves, call'd in the West-Indies, Silk Grass.

7. ALOE, *Americana sobolifera*. H. L. The American Aloe, which produces young Plants out of the Flower-Stems.

8. ALOE, *vulgaris*. C. B. The common Barbadoes Aloe.

9. ALOE, *Africana foliis glaucis, margine & dorso parte superiore spinosis, flore rubro*. Com. Præl. The African stalky Aloe, with glaucous serrated Leaves and red Flowers.

10. ALOE, *Africana caulescens, foliis spinosis, maculis ab utraque parte albicantibus notatis*. H. A. The common large spotted African Aloe, falsely call'd, The Carolina Aloe.

11. ALOE, *Africana caulescens, foliis spinosis, maculis ab utraque parte albicantibus obscurioribus, magis glaucis quam præcedens*. Boerb. The large spotted African Aloe, with Leaves more glaucous, i. e. bluer or grayer than the former.

12. ALOE, *Africana arborescens, montana non spinosa, folio longissimo, plicatili, flore rubro*.

rubro. H. A. The African Aloe Tree, with flat long smooth Leaves without Spines.

13. ALOE, *Africana caulescens, foliis glaucis caulem amplectentibus dorso integro spinoso.* Com. Rar. The African stalk'd Aloe, with glaucous Leaves surrounding the Stalks, and Spines growing on the Back of the Leaves.

14. ALOE, *Africana caulescens foliis glaucis, brevioribus, caulem amplectentibus foliorum parte interna & externa nonnihil spinosa.* Com. Rar. The African Aloe, with shorter glaucous Leaves, surrounding the Stalks and Spines within and outside of the Leaves.

15. ALOE, *Africana caulescens, foliis glaucis brevissimis, foliorum summitate interna & externa nonnihil spinosa.* Com. Rar. The African Aloe, with the shortest glaucous Leaves, and Spines on both Sides of the Leaves at the Extremity.

16. ALOE, *Africana humilis, spinis incrumbis & verrucis obsita.* Com. Rar. The Dwarf African Aloe, with Leaves arm'd with Spines and Warts, commonly call'd, the Hedge-hog Aloe.

17. ALOE, *Africana humilis, foliis ex albo & viridi variegatis.* Com. Rar. The Dwarf African Aloe, with green and white variegated Leaves, commonly call'd, the Partridge Breast Aloe.

18. ALOE, *Africana erecta, triangularis & triangulari folio viscoso.* Com. Rar. The upright triangular-leav'd viscous Aloe.

19. ALOE, *Africana erecta rotunda folio parvo, & in acumen rigidissimum excurrente.* Com. Rar. The upright African Aloe, with small sharp pointed Leaves.

20. ALOE, *Africana flore rubro, folio triangulari verrucis & ab utraque parte albicantibus notato.* H. A. The triangular-leav'd African Aloe, with white Tubercles on every Part of the Leaf, and red Flowers.

21. ALOE, *Africana margaritifera minor.* H. A. The small Pearl Aloe.

22. ALOE, *Africana folio in summitate triangulari margaritifera, flore subviridi.* H. A. The greater Pearl Aloe; vulgô.

23. ALOE, *Africana foliis planis conjugatis carinatis verrucosis, caule & flore corallii colore.* Boerb. Ind. The African Aloe, with plain fleshy Leaves growing opposite, and are full of Tubercles, with red Flowers.

24. ALOE, *Africana minima, atroviridis, spinis herbaceis numerosis ornata.* Boerb. Ind. The least African Aloe, with dark green Leaves, which are set very thick, with greenish Spines.

25. ALOE, *Africana flore rubro, folio maculis albicantibus ab utraque parte notato.* H. A. The Tongue Aloe; vulgô.

26. ALOE, *Africana foliis planis latoribus minime serratis, carinatis, caule & flore corallii colore.* Ind. The broad-leav'd Tongue Aloe; vulgô.

27. ALOE, *Africana foliis longis conjugatis, supra cavis margaritifera, flore rubro elegantissima.* Boerb. Ind. The Pearl Tongue Aloe; vulgô.

28. ALOE, *Africana caulescens, folio crasso obscure viridi, spinis ad latera & in dorso*

armato. Boerb. Ind. The stalky African Aloe, with thick dark green Leaves arm'd with Spines on the Back-side of the Leaves.

29. ALOE, *Africana caulescens, foliis glaucis caulem amplectentibus.* H. A. The stalky African Aloe, with glaucous Leaves surrounding the Stalks.

30. ALOE, *Africana caulescens, foliis minus glaucis caulem amplectentibus, floribus rubris.* The Sword Aloe; vulgô.

31. ALOE, *Americana foliis ex albo & viridi eleganter variegatis.* Hort. Beaum. The strip'd American Aloe.

32. ALOE, *Africana brevissimo, crassissimoque folio, flore subviridi.* H. A. The Cushion Aloe; vulgô.

33. ALOE, *Africana folio triangulo longissimo & angustissimo, floribus luteis fetidis.* H. L. The African Aloe, with long narrow triangular Leaves, and stinking yellow Flowers, commonly call'd, Iris Uvaria.

34. ALOE, *Guineensis, radice geniculata, foliis e viridi & atro undulatum variegatis.* Com. Præf. The Guiney Aloe, with knotted Roots, and undulated variegated Leaves.

35. ALOE, *Zeylanica, humilis, foliis variegatis.* Par. Bat. The Dwarf Zeylon Aloe, with variegated Leaves.

36. ALOE, *Africana caulescens, foliis minus glaucis caulem amplectentibus, dorso parte suprema spinosa.* Com. Rar. The stalky African Aloe, with less glaucous Leaves surrounding the Stalks, with Spines on the Back-side of the Leaves at the Extremity.

37. ALOE, *Indiæ Orientalis, serrata, succotrina vera, flore Phœnicio.* H. Beaum. The Succotrine Aloe.

The Soil in which these Plants thrive best, is, one half fresh light Earth from a Common; (and if the Turf is taken with it, and rotted, it is much better); the rest should be white Sea-Sand, and sifted Lime-Rubbish, of each an equal Part; mix these together six or eight Months at least before it is used, observing to turn it over often in this Time.

The first of these Aloes is very hardy, in respect to Cold, and has, in mild Winters, endur'd abroad, being planted in a very dry Soil, and under a South Wall; but may be kept in Pots or Tubs in a common Green-house with Oranges, Myrtles, &c. but must have very little Moisture in Winter. Most of the other Sorts are better preserv'd in an airy Glass-Case, in which there is a Stove to make a little Fire in very bad Weather; to dry and warm the Air in foggy, cold, or wet Weather, and to prevent the Frost from entering the House.

The fifth, sixth, seventh, eighteenth, thirty-fourth and thirty-fifth Sorts require a greater Share of Heat to preserve them in Winter, and should be set in a good Stove, and kept nearly to the Degree of Heat (mark'd upon Mr. Fowler's Botanical Thermometers) ten Degrees above temperate. Indeed most of the other Sorts may be kept in the same Temperature of Heat in Winter, but then you must observe, that the greater the Heat

is in Winter in which you keep them, the more Water they will require: And if they are well manag'd in this Heat, they will grow very much in Winter, therefore great Care must be taken in the severe Cold, that it doth not enter the House, nor that the Heat be at that Time lessen'd; as also how you begin to give them Air in the Spring, for the extream Parts of the Plants will be rendred very tender, by their growing freely in Winter, and the least Check to their Growth at that Season, is very often their Destruction.

About the Beginning of *June*, most People (in *England*) set their Pots of *Aloes* out of the House; but, if this be done, they should be set under the Shelter of Hedges, or Trees, to screen them from the Violence of the open Sun and Wind, which, in a few Days, will otherwise change their Colour, and very much diminish their Beauty, and very often the great Rains which fall in *June* and *July*, either rot, or fill them with so much Moisture, as, in Winter, to be liable to Destruction with the least Cold; therefore, upon the Whole, it is much more adviseable to keep them most Part of the Year in the House (as is the constant Practice in *Holland*) giving them, in good Weather, as much free open Air as is possible, and screening them with Mats, Shutters, or Tarpawlines over the Glasses, from the great Heat of the Sun in the Middle of the Day.

In the Middle of *July* is a very proper Season to shift these Plants; at which Time you may take them out of the Pots, and with your Fingers open the Roots, and shake out as much of the Earth as possible, taking off all dead or mouldy Roots, but do not wound or break the young fresh ones: Then fill the Pot about three Parts full of the above-mention'd Earth (putting a few Stones in the Bottom of the Pot, to drain off the Moisture;) and after placing the Roots of the Plant in such a Manner as to prevent their interfering too much with each other, put in as much of the same Earth, as to fill the Pot almost to the Rim, and observe to shake the Plant, so as to let the Earth in between the Roots, and then with your Hand settle it close to the Roots of the Plant, to keep it steady in the Pot; then water them gently, and set them abroad in a shady Place, where they may remain for three Weeks, giving them gentle Waterings, if the Weather proves hot and dry.

Toward the latter End of *August*, in a dry Day, remove them into the House again, observing to give them as much free open Air as possible, while the Weather holds warm; but, if the Nights are cool, you must shut up the Glasses, and give them Air only in the Day; and, as the Cold increases, you must decrease opening the Glasses, but observe to give them gentle Waterings often, till the Middle of *October*, when you must abate them, according to the Heat of the House in which they are kept.

The first Sort may be set abroad in the Beginning of *May*, and remain so till *October*; and, in dry Weather, must have frequent, but

gentle Waterings, and should be shifted every Year, taking off all the Suckers and rotten Roots, which, if suffer'd to remain on, will greatly retard the Growth of the Plant.

The thirty-third Sort is very hardy, and should be planted abroad under a good South-wall, where it will thrive and increase much faster than if kept in Pots, and will produce much stronger Flowers.

How increas'd.] These *Aloes* are all increas'd by Off-sets, which should be taken from the Mother Plant, at the Time when they are shifted, and must be planted in very small Pots, filled with the same Earth, as was directed for the old Plants; but if, in taking the Suckers off, you observe that Part which join'd to the Mother Root to be moist, you must let them lie out of the Ground in a shady dry Place two or three Days to dry before they are planted, otherwise they are very subject to rot.

After planting, let them remain in a shady Place (as was before directed in shifting the old Plants) for a Fortnight, when you should remove them to a very moderate Hot-bed, plunging the Pots therein, which will greatly facilitate their taking new Roots; but observe to shade the Glasses in the Middle of the Day, and to give them a great deal of Air.

Toward the End of *August*, begin to harden these young Plants, by taking off the Glasses in good Weather, and by raising them at other times with Bricks, that the Air may freely enter the Bed, which is absolutely necessary for their Growth, and to prepare them to be remov'd into the House, which must be done toward the End of *September*, and manag'd as before directed for the old Plants.

Most of the *African* Sorts of *Aloes* do produce Flowers with us annually, when grown to a sufficient Size, which is often the second, and seldom more than the third or fourth Year, after planting from Off-sets; but the *American Aloes* (which do, for the most Part, produce their Flower-stems immediately from the Center of the Plant) seldom flower till they are of a considerable Age, and this but once during the Life of the Plant; for when the Flower-stem begins to shoot from the Middle of the Plant (which, for the most Part, is of a large Size, and grows to a great Height) it draws all the Moisture and Nourishment from the Leaves, so that, as that advances, the Leaves decay; and when the Flowers are fully blown, scarce any of the Leaves remain alive; but whenever this happens, the old Root sends forth a numerous Quantity of Off-sets for Increase; and it is not till this Time, that some of these Sorts can be increas'd, especially the seventh Sort, which never produces any young Plants until it flowers, at which Time the Flower-stem is beset with small Heads from Bottom to Top, which being taken off, and planted, will grow as well as Suckers from the Roots.

This *Aloe*, which, with us, seldom makes a very large Plant, hath yet produced Flower-stems of a considerable Size, and fifteen Foot in Height. The Flowers are little less than those

those of the large Sort. I can't here forbear taking Notice of a vulgar Error or two relating to the large *American Aloe*, which is, that it never flowers until it is an hundred Years old, which is a Mistake; since we have had several of them flower in *England*, some of which were known not to exceed fifty Years old; and others, which flower'd many Years ago, cannot be suppos'd to have been in *England* so long as to arrive at that Age, since they were thought too tender for our Climate at that Time, when Green-houses were not known; as may be seen by looking into *Gerard's* and *Parkinson's* Herbals.

Another common Error is, that when the Flower opens, it makes a Report like that of firing a Gun: This is sufficiently confuted by all those who have been where these Plants have flower'd; but I suppose the Rise of this Story might proceed from some Persons saying, when one of these Plants flower'd, it made a great Noise; meaning thereby, that whenever one of them flower'd in *England*, it was spread abroad as an uncommon Thing, and occasion'd a great Noise amongst the neighbouring Inhabitants; most of whom usually repair to see it, as a Thing that rarely happens, and as a great Curiosity.

The *African Aloes* do, for the most part, afford Plenty of Suckers, by which they are increased; but those few that do not, may be most of them propagated, by taking off some of the under Leaves, laying them to dry for three or four Days, as was directed for the Off-sets; then plant them in the same Soil as was directed for them, putting that Part of the Leaf which did adhere to the old Plant, about an Inch or an Inch and half (according to the Size of the Leaf) into the Earth, giving them a little Water to settle the Earth about them; then plunge the Pots into a moderate Hot-bed, observing to screen them from the Violence of the Sun, and give them gentle Refreshings with Water: The best Season for this is in *June*, that they may push out Heads before Winter.

ALOIDES; [Of 'Αλῶν and ἄλσος, form.] *Boerb. Ind. Stratiotes foliis Aloes semine longo. Gund. Raii Syn.* The Water Aloe, or Fresh-water Soldier.

This Plant is found in large standing Waters in the Isle of *Ely*, and in *Lincoln-shire*, but will not grow in a Garden: But if young Plants be put into an open Canal in the Spring, they will thrive and propagate therein.

ALOPECUROS, [Gr. 'Αλοπεκος,] Fox-tail; a kind of Grass.

ASCHYNOMENE, ['Ασχύνουμ]; vide *Mimosa*.

ALSINE, [Gr. Ἀλσίς,] Chick-weed.

ALTHÆA, [Ἀλθαία of ἰαθεῖν, a Medicament; or ἰαθεῖν, Greek, to heal] Marsh-mallow.

The Characters are;

It is in all respects like the Mallow; but the Leaves of these are generally more soft and woolly.

There are several Kinds of this Plant, some of which rise to the Height of eight or ten Feet, and become woody: These are proper Ornaments for Quarters of Wilderness-work, to intermix with flowering Shrubs and Trees: They begin to flower toward the latter End of *May*, and continue till *October* (if the Weather proves good): Their long Continuance in Flower, together with their great Variety of soft woolly Leaves, renders them worthy of a Place in the best Gardens of Flowering-Trees.

The different Species of these known in *England* are,

1. **ALTHÆA, frutescens, folio acuto, parvo flore. C. B.** The shrubby Marsh-mallow, with sharp-pointed Leaves, and small Flowers.

2. **ALTHÆA, frutescens, Lusitanica, folio ampliore, minus incano. Tourn.** The Portugal shrubby Marsh-mallow, with large, and less hoary Leaves.

3. **ALTHÆA, frutescens, Lusitanica, folio rotundiori undulato. Tourn.** The Portugal shrubby Marsh-mallow, with rounder and undulated Leaves.

4. **ALTHÆA, frutescens, folio bryonia. C. B.** The shrubby Marsh-mallow, with briony Leaves.

5. **ALTHÆA, flore majore, C. B.** The large Flower'd Marsh-mallow.

6. **ALTHÆA, Dioscoridis & Plinii. C. B.** The Common Marsh-mallow.

7. **ALTHÆA, folio rotundiori aut minus acuminato. Suther.** The Rounder-leav'd Marsh-mallow.

These Plants are all easily raised from Seeds which must be sown in *March*, in a light dry Soil, and in two Months Time they will be fit to transplant in the Places where they are to remain for good, or put into Pots; that when they are remov'd, the Earth may be turn'd out of the Pots, without disturbing the Roots, for these Shrubs will not bear a Remove (when grown to any considerable Stature); the Roots being for the most part compos'd of strong woody Parts, and have very few small Fibres, so that the Earth is subject to fall intirely off, upon removing them; and if it so happen to grown Plants, they rarely are made to grow afterwards.

The second Year these Shrubs begin to flower, and one single Plant (if suffer'd to seed) will produce enough to raise many hundred Plants: They are impatient of Wet in Winter, therefore should be planted in a dry rubbishy or sandy Soil, where they will stand much better than in a strong rich Earth; but they are seldom longer-liv'd than five or six Years (with us), especially if suffer'd to flower and seed plentifully every Year; therefore the best Way to preserve them is, to cut off the extreme Parts of the Branches in *July*, that they may make fresh Shoots before Winter; this will also make their Heads more regular, than if they were suffered to grow rude.

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They may be also raised by planting Cuttings in *May*, in a light Soil, keeping them shaded, and often refreshing them with Water until they have taken Root.

The five first mentioned Sorts are all Strangers to our Country, and are only to be found in the Gardens of the Curious: The two last Sorts grow wild in many Parts of *England*, and are by some propagated in Gardens for physical Use: These two Sorts are also raised from Seeds, or by parting the Roots early in the Spring, and will grow in almost any Soil or Situation. These two die down to the Ground annually, and rise again the succeeding Spring.

ALYSSON, [*Ἀλυσσών*, of *ἀλυσσών*, Gr. to be mad; so called, because it was believ'd to have the Vertue of curing Madness or Rage by barely being look'd upon.]

The Characters are;

The Flowers consist of four Leaves, which are expanded in Form of a Cross: The Fruit is short and smooth, in which are contain'd many roundish Seeds.

There are two or three Species of this Plant, which for their Beauty deserve a Place in the most curious Gardens; viz.

ALYSSON, *Creticum saxatile foliis undulatis incanis*. T. Cor. The Alysson of Candia, with hoary undulated Leaves.

2. **ALYSSON**, *halimi folio sempervirens*. Tourn. The Alysson, with Sea Purslane Leaves.

3. **ALYSSON**, *Alpinum hirsutum luteum*. Tourn. The Yellow Alpine Alysson, with hairy Leaves.

The first of these Sorts will grow to be near two Foot high, with a woody Stem, and may be form'd into a regular Head; and being planted in the middle of Borders, in a Flower-Garden, is a very great Ornament thereto: It produces large Quantities of bright yellow Flowers in the beginning of *April*, which continue till some Time in *May* (especially if the Weather proves cool): When it is in Flower, the whole Plant appears, at a little Distance, to be nothing but Flowers, the Leaves and Stem being quite hid until you come near the Plant.

This Plant is hardy, and although brought from a more Southerly Climate, yet, if planted in a dry, lean, or rubbishy Soil, will endure our severest Winters Abroad: It is increased by sowing the Seeds in *March*, in a light sandy Soil, or by planting Cuttings in *April*, or *May*; which are very apt to take Root, if kept shaded in the Heat of the Day, and gently refreshed with Water.

The second Sort seldom continues above two or three Years with us, and must therefore be often sown to preserve it; or if the Seeds are suffered to fall, and remain upon the Ground, it will rise again without any Trouble: This Plant spreads itself upon the Ground, and never rises to any Height: It produces, at the Extremity of its Branches, very pretty Tufts of small white Flowers; of which the Plant is seldom destitute for six or

seven Months successively; for which Reason it deserves a Place in the Gardens of the Curious: This will also grow from Cuttings, if planted and managed as the former.

The third Sort is a very humble Plant, rarely rising with us above two or three Inches high: It produces abundance of small yellow Flowers early in the Spring, when few other Flowers appear, for which it is valuable: It is increas'd by parting the Roots in *Autumn*, and requires a light sandy Earth, and to be expos'd only to the Morning Sun.

AMARANTOIDES; [Of *Ἀμαράνθος* and *ἄσπερος*, Gr. form.] Globe *Amaranthus*, or Everlasting Flower; and by the French, *l'Immortal*.

The Characters are;

The Flowers are small, and cut into four Segments, which are collected into squamose Heads; from each of these Scales is produced a single Flower: The Ovary in the Bottom of the Flower becomes a roundish crooked Seed, which is contain'd in a thin Pellicule, or Skin.

There are, at present, four or five Varieties of this Plant in *England*, but there are but two of them valuable for a Garden of Pleasure; the other Sorts produce smaller Flowers, and are much later, and require a great Heat to bring them to flower tolerably with us: The two best Sorts were brought from the *East-Indies* into *Europe*; but the other Sorts we have receiv'd from *Barbados*: I shall only mention the valuable Sorts, and pass over the other, as fit only for the Curious in Botany.

1. **AMARANTOIDES**, *Lycnidis folio, capitulis purpureis*. Tourn. The Purple Globe *Amaranthus*, or Eternal Flower.

2. **AMARANTOIDES**, *Lycnidis folio, capitulis argenteis*. The white (or silver-colour'd) Globe *Amaranthus*, or Eternal Flower.

The first of these Plants is now become very common in every curious Garden near *London*, but the latter is, at present, a great Rarity: I received the Seeds of this Plant from *James Theobald*, Esq; with several other curious Seeds which he procur'd from *China*; several of which succeeded very well in the Physick Garden at *Chelsea*.

These Plants are some of the greatest Beauties amongst the whole annual Tribe: They must be sown very early in a good Hot-bed, and treated as will be hereafter directed for the *Amaranth's*, with this Difference only, that these must have a greater Share of Heat, and forwarded more in the Spring.

These Flowers, if gathered before they decay on the Plant, and kept in a dry Place, will remain in Beauty for some Years, especially if they are not too much expos'd to the Air: They are therefore very proper Ornaments for Ladies to wear in their Hair, and are far preferable to any artificial Flowers whatever: The Purple and White of these Flowers, together with some Varieties of the *Elicrysus's* and *Xeranthemum's*, will make a curious Variety of dry Flowers for Basons to adorn Rooms in the Winter Season, when few other Kinds are to be had.

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The Portuguese and Spaniards are very fond of these Flowers, and cultivate great Quantities of them in their Gardens, for adorning their Places of Worship in the Winter time. The Seeds of this Plant being closely surrounded with a thin Skin, do appear to some Persons, who are unacquainted therewith, to be only a chaffy Substance without any good Seeds; for the Seeds which are small, and of a roundish Form, seldom quit this Covering, unless rubbed out; but if the Seeds are sown with these Coverings over them, they will come up full as well as if taken out.

If the Autumn should prove cold or wet, it will be very necessary to remove the Pots, with these Plants, into Shelter, otherwise they will not perfect their Seeds; especially if they were not sown very early in the Spring. If these Pots are preserved in a good Greenhouse, their Flowers will make a very pretty Variety amongst other Plants, and will continue until the Middle or latter End of November, provided the Weather proves not too cold: But what Flowers you intend to preserve, should be gathered soon after they arrive at their proper Bigness, for if they are suffer'd to remain very long after, the under Part of their Heads will change brown, and decay.

AMARANTHUS, or AMARANTUS; [*Amaranthus* and *Amarantus*, of a Priv. and *maeris*, Gr. to wither; so called, because the Flower of this Plant being cropp'd, does not soon wither; but being dried, keeps the Beauty of its Colour a great while.] *Amaranthus*.

The Characters are;

The Flowers have seemingly no Petals; the Cup of the Flower is dry and multifid; the Seeds are included in membranaceous Vessels, which, when come to Maturity, burst open either transversely or horizontally, after the manner of Purslane and Pimpernel, in each of which is contained one or more roundish Seeds.

There are a vast Variety of these Plants, both in the East and West-Indies; many of which are extremely beautiful, and as much deserve our Care as any of the flowery Tribe. I shall here take Notice of the several Varieties which are cultivated in the English Gardens for their Beauty, omitting the other more common or less worthy Sorts, as more fit for a Botanical Disquisition.

1. *AMARANTHUS, maximus. C. B.* The Tree *Amaranthus*; vulgô.

2. *AMARANTHUS, maximus, paniculâ longâ pendulâ, semine rubello. Raii Hist.* The Long pendulous *Amaranthus*, with reddish-coloured Seeds, commonly called, Love lies a bleeding.

3. *AMARANTHUS, spica albescente habitore. Martyn. Hist.* *Amaranth*, with a thick whitish Spike.

4. *AMARANTHUS, cristatus, flora rubicundissime. H. R. Par.* Cock's-comb *Amaranth*, with red Flowers.

5. *AMARANTHUS, cristatus, colore kermesino. Boerb.* Carmine-colour'd Cock's-comb *Amaranth*.

6. *AMARANTHUS, cristatus, colore aureo. Boerb.* Gold-colour'd Cock's-comb *Amaranth*.

7. *AMARANTHUS, cristatus, colore purpureo. Boerb.* Purple Cock's-comb *Amaranth*.

8. *AMARANTHUS, cristatus, colore luteo. Boerb.* Yellow Cock's-comb *Amaranth*.

9. *AMARANTHUS, Sinensis, foliis variis, paniculâ eleganter plumosâ. Martyn. Hist.* Chinese *Amaranth*, with variegated Leaves, and a fine feather'd Panicle.

10. *AMARANTHUS, tricolor. H. Eyst.* The three-coloured *Amaranth*.

11. *AMARANTHUS, bicolor.* The two-coloured *Amaranth*.

All these Sorts of *Amaranth*s must be sown on a good Hot-bed in February, or the beginning of March at farthest; and in about a Fortnight's Time (if the Bed is in good Temper) the Plants will rise, when you must prepare another Hot-bed, covered with good rich light Earth, about four Inches thick; then raise up the young Plants with your Finger, so as not to break off the tender Roots, and prick them into your new Hot-bed about four Inches Distance every Way, giving them a gentle Watering to settle the Earth to their Roots: But in doing this, be very cautious not to bear the young Plants down to the Ground by hasty watering, which do rarely rise again, or at least so as to recover their former Strength in a long Time, but very often rot in the Stems, and die quite away.

In the Heat of the Day keep them screen'd with Mats from the great Heat of the Sun, and give them Air by raising up the Glasses with a small Stone; and if the Glasses are wet, it will be proper to turn them every Day (in good Weather) that they may dry; for the Moisture, which is occasioned by the Fermentation of the Dung, and Perspiration of the Plants, is of a noxious Quality, and very unkindly to Plants, so that if the Weather happens to prove bad, that you can't turn your Glasses, it will be of great Service to your Plants, to wipe off all the Moisture two or three times a Day with a Woollen Cloth, to prevent its dropping upon the Plants: When your Plants are firmly rooted, and begin to grow, you must observe to give them Air every Day (more or less, as the Weather is cold or hot) to prevent their drawing up too fast, which greatly weakens their Stems.

In about three Weeks or a Month's Time, these Plants will have grown so as to meet, and will stand in need of another Hot-bed, which should be of a moderate Temper, and covered with the same rich Earth about six Inches thick, in which they should be planted (observing to take them up with as much Earth about their Roots as possible) seven or eight Inches Distance every Way, giving them some Water to settle the Earth about their Roots; but be very careful not to water them heavily, so as to bear down the Plants, (as was before directed) and keep them shaded in the Heat of the Day, until they have taken fresh Roots, and be sure to refresh them often (but gently) with Water, and give them Air in Proportion to the Heat of the Weather, covering the Glasses with Mats

Mats every Night, lest the Cold chill your Beds, and stop the Growth of the Plants.

In the Beginning of *May* you must provide another Hot-bed, which should be covered with a deep Frame, that your Plants may have Room to grow : Upon this Hot-bed you must set as many three-penny Pots as can stand within the Compass of the Frame ; these Pots must be filled with good rich Earth, and the Cavities between each Pot filled up with any common Earth, to prevent the Heat of the Bed from evaporating, and filling the Frame with noxious Steams ; then with a Trowel, or some such Instrument, take up your Plants (from the former Hot-bed) with as much Earth as possible to the Roots, and place each single Plant in the Middle of one of the Pots, filling the Pot up with the Earth before described, and settle it close to the Root of the Plant with your Hands ; water them gently, as before, and shade them in the Heat of the Day from the Violence of the Sun, by covering the Glasses with Mats ; refresh them often with Water, and give them a good Quantity of Air in the Day-time.

In about three Weeks more, these Plants will have grown to a considerable Size and Strength, so that you must now raise the Glasses very much in the Day-time ; and when the Air is soft, and the Sun is clouded, draw off the Glasses, and expose them to the open Air, and repeat this as often as the Weather will permit, which will harden them by degrees to be remov'd abroad into the Places where they are to remain the whole Season. But 'tis not adviseable to set these Plants out until a Week in *July*, observing to do it when the Air is perfectly soft, and, if possible, in a gentle Shower of Rain.

Let them at first be set near the Shelter of a Hedge for two or three Days, where they may be screen'd from the Violence of the Sun, and strong Winds, to which they must be inur'd by degrees : These Plants, when grown to a good Stature, perspire very freely, and must be every Day refresh'd with Water, if the Weather proves hot and dry, otherwise they will stunt, and never produce their Plumes so fine as they would do if taken Care of.

This is the proper Management, in order to have fine *Amarantbs* ; which, if rightly followed, and the Kinds are good, in a favourable Season, will produce wonderful large fine Flowers, and are the greatest Ornament to a good Garden for upwards of two Months : By this Method I have had Plants five or six Foot high, with Crests near a Foot in Breadth ; and I am persuaded, if the Kind is good, (and there is no Want of Dung, or Conveniencies) in a kindly Season, they will grow much larger.

In the Beginning of *September*, the *Amarantbs* will have perfected their Seeds, so that you must make Choice of the largest, most beautiful, and best branching Plants of each Kind for Seed ; which you should remove under Shelter, (especially if the Weather

proves wet, or the Nights frosty) that the Seeds may be maturely ripen'd ; and, in the Choice thereof, be sure never to take any Seeds from Side-Branches, nor from the Neck of the Plume, but such only as are produced in the Middle thereof, which in many Plants, perhaps, may be but a small Quantity ; but I do assure you, it is those only you can depend upon to have your Kinds good the succeeding Year.

AMBROSIA ; [is so call'd of a Priv. and Begl's mortal ; either because Mortals eat of it, or because those who eat of it are render'd immortal : Or of *Βρώμα* Food, and *Θεο* God, *q. d.* the Food of the Gods, as the Poets have feign'd.]

The Characters are ;

It hath male flosculous Flowers, which are produced on separate Parts of the same Plant from the Fruit, and have no visible Petals : The Fruit which succeeds the female Flowers, is shaped like a Club, and is prickly, containing one oblong Seed in each.

The Species are ;

1. **AMBROSIA** ; *Maritima*. C. B. The Maritime or Sea *Ambrosia*.

2. **AMBROSIA** ; *Maritima*, *Artemisia foliis inodoris elatior*. H. L. Taller unsavoury Sea *Ambrosia*.

3. **AMBROSIA** ; *Canadensis*, *altissima*, *birsuta*, *Platanifolia*. Tourn. The tallest Canada *Ambrosia*, with rough Plane-tree Leaves.

The first of these Sorts may be sown early in the Spring, in a Border under a warm Wall or Pale, where it will come up very well ; and when the Plants are strong enough to remove, they may be planted into the like warm Borders, where they will flower, and perfect their Seeds in *Autumn* ; but if they have not a good Position, they seldom produce good Seeds in this Country.

The second and third Sorts are brought from *America*, where they are very common Weeds, but with us should be sown upon a gentle Hot-bed in the Spring of the Year ; and when the Plants are come up, should be transplanted upon another moderate Bed, and expos'd to the open Air by degrees : And in *May* they should be planted out into a warm Border ; but, if possible, in a very poor Soil, which will check their luxuriant Growth, and cause them to flower and seed much sooner than they would do if planted in a rich Soil. These Plants have no great Beauty to recommend them, but for Variety they may be admitted into large Gardens.

AMENTACEOUS Flowers ; [are so call'd of *Amentatus*, fasten'd with a String, &c. of *Amentum*, Lat. a String, Thong, or Latchet] are such as have an Aggregate of Summits, hanging down in Form of a Rope or Cat's-Tail, which is also call'd an *ulus*.

AMMI, [*Ammi*, Gr.] Bishop's-weed.

The

The Characters are ;

This is an umbelliferous Plant, with small striated Seeds : The Petals of the Flower are unequal, and shap'd like a Heart.

The Species are ;

1. AMMI ; *majus*. C. B. The greater Bishop's-weed.

2. AMMI ; *majus*, *foliis plurimum incis, & nonnihil crispis*. C. B. The greater Bishop's-weed, with fine cut Leaves.

3. AMMI ; *perenne*. M. Um. Perennial Bishop's-weed.

The Seeds of the first and second Kind should be sown in an open Situation early in the Spring ; and when the Plants are young, they may be prick'd out into Beds of sandy Soil, at about six Inches Distance from each other, observing to water them until they have taken fresh Root ; after which Time, they will require no more Care, but to keep them clear from Weeds, and if the Season proves good, they will ripen their Seeds in Autumn.

The Seeds of the first Sort are used in Medicine : The second is a Variety of the first, which is accidental from the same Seeds : The third is an abiding Plant, which multiplies very fast by its Root, which is very apt to spread far under Ground, for which Reason it should never be planted in a good Garden. These are all Varieties fitter for a Botanick, or Physick Garden, than for Gardens of Pleasure.

AMOMUM PLINII ; *vide* Solanum.

AMORIS POMUM ; *vide* Lycopersicon.

AMPHITHEATRE ; [*Ἀμφιθέατρον* of *ἀμφί* on both Sides, and *θεῖναι*, to view. Gr.] Or Temples of View erected on a double Rising, are great Ornaments to a large and noble Garden. If this Hill or rising Ground is of a semicircular Figure, it will still be the better.

These Amphitheatres are formed of Evergreens, as *Hollies*, *Phillyreas*, *Laurustinus's*, *Bays*, &c. observing to plant the shortest growing Trees in the Front, and the tallest Trees behind, as *Pines*, *Firrs*, *Cedars of Lebanon*, &c.

AMYGDALUS ; *Ἀμυγδαλός*, Gr.] The Almond-Tree.

The Characters are ;

It hath Leaves and Flowers very like those of the Peach-Tree, but the Fruit is larger, and more compressed ; the outer green Coat is thinner and drier when ripe, and the Shell is not so rugged.

The following Sorts are propagated for Sale in the Gardens near London.

1. AMYGDALUS, *stativa*, *fructu majore*. C. B. P. The common large Almond.

2. AMYGDALUS, *dulcis putamine molliori*. C. B. P. The Sweet Almond, with tender Shells.

3. AMYGDALUS, *amara*. C. B. P. The Bitter Almond.

4. AMYGDALUS, *stativa flore albo*. The white flowering Almond.

There is also another Tree, which is preserv'd in some curious Gardens, that bears the Name of an Almond ; but I have been inform'd by Persons, who have seen the Flowers and Fruits of this Tree, that 'tis not of this Kind ; yet as it hath not received any other Title that I know of, and as I never had an Opportunity to examine it my self, I shall mention it by its former Name, *viz.*

5. AMYGDALUS, *Æthiopica*, *fructu loloferico*. Breyn. Cent. The Æthiopian Almond, with Scarlet Fruit.

The first, second, and third Sorts, are chiefly cultivated in England for the Beauty of their Flowers, which are produced early in the Spring, when few other Things appear, which renders them worthy of a Place in the best Gardens, where being intermixed with other flowering Trees, either in Wilderness Quarters, or in Walks, they afford a very agreeable Prospect.

They are propagated by inoculating a Bud of these Trees into a Plumb, Almond, or Peach-stock, in the Month of July ; (The Manner of this Operation see under the Article of *Inoculation*.) The next Spring, when the Buds shoot, you may train them up either for Standards, or suffer them to grow for half Standards (according to your own Fancy ;) and the second Year, after budding, they may be removed to the Places where they are to remain. The best Season for transplanting these Trees (if for dry Ground) is in October, as soon as the Leaves begin to decay ; but for a wet Soil, February is much preferable, and observe always to bud upon Plumb-stocks, for wet Ground ; and Almonds or Peaches, for dry.

The Almond with white Flowers, is a greater Curiosity than either of the former, and being intermixed with the other Sorts, and a few of the Cherry Plumb-trees, which flower all together, add very much to the Beauty of these Plantations : This Sort, with white Flowers, is more difficult to encrease than either of the former, and will not take upon a Plumb-stock, but must be either budded on a Peach or Almond.

The Sort with large Fruit, produces almost every Year large Quantities with us in England, which if eaten before they are too dry, are little inferior to those we receive from abroad ; but if kept too long, they are very apt to shrivel up, and lose their Plumpness ; but in other respects are very good.

The Æthiopian Sort is tender, and requires a good Green-house to preserve it in Winter ; it is increas'd by planting Cuttings (that are tender, with a Joint of the last Year's Wood) in any of the Summer Months, in Pots of good light Earth, plunging them into a moderate Hot-bed, and keeping them shaded in the Heat of the Day, giving them frequent Refreshings with Water : After they have taken Root you must begin to harden them by Degrees to endure the open Air a little before they are hous'd, which will render them fitter

to endure the Winter; for if they are too much drawn in Summer, they are very often destroyed in Winter.

These Trees may be expos'd to the open Air, with Oranges, &c. (in a well shelter'd Place, during the Months of *June, July* and *August*, but must be hous'd before the hoary Frosts fall, which will very much prejudice them, if left abroad: They must have a very good Green-House in Winter, and gentle Waterings, as you observe the Leaves to curl: but be sure not to over-wet them in Winter; which if once done, is seldom to be got dry again till Spring, and will be very prejudicial to the neighbouring Plants, by the great Damp it will occasion in the House.

ANACAMPSEROS; [*Ἀνακαμψέρος*, of *ἀνακαμψέω*, to reflect or turn back, and *ἔρως* Love; the *Magi* attributing to this Plant a Virtue of recalling Love;] *Telephium*, or *Rhodia Radix*; in *English*, Orpine, Live-ever, or Rose-root.

The Characters are,

It hath a perennial Root: The Leaves, Stalks, Flowers, and Fruit, are like those of the House-leek; but the Leaves of this Plant do not grow in a circumscrib'd Order, as do those of the House-leek; but the Plant arises with a Stalk, upon which the Leaves are plac'd on every Side: The Flowers grow in Umbels, upon the Tops of the Stalks.

These Plants are seldom preserv'd in Gardens of Pleasure, therefore I shall pass them over here, with only observing, that any of these Species may be cultivated by planting their Cuttings in any Part of the Summer, except the *Rhodia Radix*, which is only propagated by parting the Roots, either in Spring or Autumn; These all love a dry Soil, and are very hardy.

There is one Sort of this Plant which grows wild in many Parts of *England*; which is the Sort sometimes used in Medicine, and which was some Years since in great Esteem to form green Chimney-Pieces for the Summer Season, which some People were very dexterous in making, by framing a Parcel of Laths together of the just Dimension of the Place where it was to stand; and then fastening this Plant to the several Parts of it, so as to cover the whole with Green: And altho' this was only perform'd with Cuttings of the Plant, yet by giving the Whole a gentle Watering once a Week, the Plant would not only live, but shoot in Length, and continue fresh for two Months, and appear very handsome.

ANANAS; The Pine-Apple.

This Fruit (which is justly esteem'd for the Richness of its Flavour; as it surpasses all the known Fruits in the World) is produc'd from an herbaceous Plant, which hath Leaves somewhat resembling those of an *Aloe*, and are, for the most part, saw'd on their Edges, but are much thinner, and not so juicy as the *Aloe*: The Fruit resembles the Cones of the *Pine-Tree*, from whence 'tis suppos'd to have its Name.

Where this Plant is a Native, I believe it is hard to determine; but it was brought from the Factories in the *East Indies*, and planted in the hottest Islands of the *West Indies*, where they are in great Plenty and extraordinary Goodness; but it hath been very lately that it was introduc'd into the *European* Gardens, so as to produce Fruit: The first Person who succeeded in this Affair, was Monsieur *Le Cour* of *Leyden* in *Holland*, who, after a great many Trials with little or no Success, did, at length, hit upon a proper Degree of Heat and Management, so as to produce Fruit equally as good (tho' not so large) as those which are produc'd in the *West Indies*, as hath been often affirm'd by Persons who have liv'd many Years there: And 'tis to this worthy Cultivator of Gardening, who did not spare any Pains or Expence to accomplish it, that all the Lovers thereof are oblig'd, for introducing this King of Fruits amongst them; and it was from him that our Gardens in *England* were first supplied, tho' we have since had large Quantities brought from *America*. I can't here avoid taking Notice of a common Error which prevails amongst many People, which is, that the Plants brought from *America* are not so good as those which came from *M. Le Cour*; but it is a great Mistake; for were the People who sent over these Plants from *America*, careful to send the best Kinds, there would be found no Difference; for *Monf. Le Cour* had his from thence at first, as his Gardener assur'd me; and I have seen as good Fruit produc'd from *American* Plants, as any I have yet seen, and some much larger than any I saw in *Monf. Le Cour's* Garden.

There are several Varieties of this Plant, but I think the Sort with deep green Leaves, and yellow Fruit (which is what the People of the *West Indies* call the *Queen Pine*) is what succeeds best with us; but I observe more of what they call the *Red Pine* (which is a Sort that has brown Leaves, and the Fruit is of a reddish Colour, before ripe, but afterwards changes to a deep Yellow) sent to *England* than any other Sort, and I suppose is the most common Sort there: This sometimes produces very large Fruit, but is seldom so well tasted as the *Queen Pine*, and is very subject to produce very large Heads upon the Top of the Fruit: This Sort seems to be the hardiest of any we have in *England*, and is very apt to increase, by which Means it is become the most common of any amongst us.

There is another Sort, with very smooth Grass-green Leaves, which was rais'd from Seeds taken out of a rotten Fruit, which came from the *West Indies*, to the late *Henry Heathcote*, Esq; from whom I receiv'd one Plant, which hath not yet produc'd Fruit, but I am told it is what the People of *America* call the *King-Pine*: And I have lately receiv'd some young Plants, which came by the Name of the *Surinam-Pine*; and, by the Account I receiv'd of it, the Fruit is quite green when ripe, and of an excellent Flavour: I also observ'd, in one Garden in *Holland*, a Sort with

very

very narrow Leaves, without any Serratures on the Edges; but what Sort of Fruit it produc'd I could not learn.

These Plants are propagated by planting the Heads which grow upon each Fruit; or by Suckers produc'd from the old Stems, which must be planted in Pots about five or six Inches over at top, fill'd with good fresh light Earth, mix'd with a little very rotten Dung, which must be often turn'd to mix them the better together, giving them a little Water to settle the Earth to their Roots; then plunge them into a well-temper'd Bed of Tanner's Bark. For the Manner of making these Beds, I shall refer you to the Article of *Hot-beds*.

Take care to give them frequent but gentle Refreshings with Water, and if your Bed should decline its Heat, it will be very proper to add a little fresh Bark thereto, which must be mixed with the old, and will cause it to ferment again and increase the Heat of your Bed.

Observe also, as the Nights grow cold in *August* and *September*, to increase your Covering over the Glasses, that by this means, your young Plants may be furnish'd with strong Roots before Winter: Toward the latter End of *October*, you must remove these Plants out of the Bark-bed into the Stove, (especially those Plants that are strong enough to produce Fruit the next Year (disposing them regularly on the Stands so as not to crowd each other, nor their Leaves to interfere, if you have Room enough in your Stove to prevent it.

During the Winter-Season, you must observe to keep the Stove to a good Temper of Heat, (never suffering the Spirit in the Thermometer to fall below the Degree of Heat, which is assign'd them on Mr. *Fowler's* Botanical Thermometers;) nor should the Spirit be ever rais'd much above five Degrees more, for too great a Heat would forward their Fruiting too much, and Cold would prevent it for that Season, so that the middle Degree of Heat is best: Forget not to refresh them with Water (which should be plac'd in the same Stove at least twenty-four Hours before used, that the Cold may be taken off) at least once a Week or oftener, according to the Temper of your Stove, or as you find the Earth in the Pots to require it.

Your Plants thus manag'd, will, by the beginning of *February*, or soon after, shew their Bud for Fruit in the Center of the Plant, and must therefore be diligently kept forwarded by gently increasing the Heat of the Stove, and often repeating your Watering: In the middle of *February*, you must prepare your Tan for the Hot-bed, which should be made at least a Month before the Plants are set into it, that the great Heat of the Bed may be pass'd, which would be subject to burn the extreme Parts of the Roots, and thereby give so great a Check to the Plants, as not to be recovered again in two Months: and this very often spoils the Fruit, by retarding the Growth of the Plant; so that whenever they begin to recover their Vigour, that Nourishment which should have

been employ'd to increase the Bulk of the Fruit, is all spent in furnishing a large Top or Crown to a small insignificant Fruit.

Toward the middle or latter End of *March* (according as you find the Bed in Temper, or the Weather favourable) you may remove your Plants into the Bark-bed (plunging the Pots at first but half way into the Bark) that the sudden Heat to their Roots may not be violent, but observe to keep your Glasses cover'd in bad Weather and in the Night, that you may preserve a constant warm Air in the Bed; and if it should happen to prove very hot in the Day, give them a little Air, by raising the Glasses with a small Stone; and if the Sun should shine very hot upon the Glasses, it will be adviseable to shade them, in the middle of the Day, from the Violence thereof, which (especially at their first coming out of the Stove) would alter and change the Colour of the Plants, and be very prejudicial to them.

In about three Weeks, or a Month's time after your Plants were set into the Bark, you may raise them up again, and stir the Surface of the Bark with a small Dung-fork, and plunge the Pots down to their Rims therein; for by this time there will be no Danger of hurting their Roots with Heat; and observe to give them frequent Waterings, as they shall require it; and at this Time you may shift such of your Plants as do not fruit, into larger Pots (if they require it;) and if you stir up the Earth on the Surface of the Pots where there is Fruit, and take it out with your Hands, filling them up again with good fresh Earth, it will be of great Service to your Fruit; but have a Care in this Operation, not to let any Earth in amongst the Leaves of the Plant, nor to disturb the Roots too much, both which will be hurtful to them.

During the Summer Season, give them frequent Waterings, and shade them from the Violence of the Sun in very hot Days, and give them Air, by raising the Glasses in proportion to the Warmth of the Bed and Heat of the Weather; and if you find your Bed grow cold, you must stir up the Bark with a Dung-fork almost to the Bottom, loosening and breaking the Lumps; and if you add a little fresh Bark to it, it will increase the Heat, and then plunge the Pots into it again: This may be repeated two or three times in a Summer, according to the Temper of the Bed, by which Means your Plants will be always kept in a growing State. These few Rules, if rightly observ'd, will, I doubt not, afford the Practitioner Success. As for the Contrivance of *Stoves*, I shall refer the Reader to the Article on that Subject, where he will be furnish'd with their several Descriptions.

The Time of this Fruit's ripening is, from the Beginning of *July* till *September*; after which Time, the Fruits that ripen are seldom well tasted, the Season being so far spent, that we have not Heat enough to correct the Crudities, which are imbib'd in the long Nights, from the Vapours of the Bed, and their own Perspiration in the Day-time.

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The manner of judging when they are mature, is, by the strong Smell they emit like that of ripe Fruits, and by gently pressing the Protuberances of the Fruit with your Thumb and Finger; and if they give Way, it is a certain Sign of Ripeness: Nor will this Fruit keep above three or four Days at most, if suffer'd to remain on the Plant, before its high Flavour will be lost; and if cut, it should not be kept above twenty fours at most, if you would eat it in Perfection; but if you would keep them back a little Time, you should do it before they are quite ripe, or soon after they begin to change the Colour; which may be effected by allowing them a greater Share of Air in the Day time, and by screening the Glasses with Mats in the Heat of the Day.

This Fruit should be serv'd up to Table intire, (without breaking off the Crown, as is by some practis'd) which greatly spoils the high Flavour of the Fruit, by letting out a Part of its Juice, and by opening the Fruit to imbibe the moist Particles floating in the Air of the Place where it is kept, which greatly flattens that delicate Poignancy which is always found in a fresh kindly Fruit of this Sort.

When the Fruit is to be eat, you may take the Stalk thereof in one Hand, and the Crown of the Fruit in the other, and by gently twisting it, they will readily part, and the Crown will come out more entire, and fit for planting than if cut off, and the Fruit will be less injur'd: Then you may cut it into transverse Slices, in Proportion to the Company that is to eat of it, laying them singly on a Plate; the outside Coat must be par'd off, as in many other Fruits, which would be troublesome in eating; the Inside of a good Fruit will cut almost as firm as a Nectarine, and is of a most delicious Flavour, and very full of Juice, and is justly term'd the King of Fruits.

ANAPODOPHYLLON; [of *Ana*, Lat. a Duck, *πῦς*, a Foot; and *φυλλον*, Gr. a Leaf] Duck's foot, or *Pomum Maiale*, i. e. May-apple.

The Characters are;

The Cup of the Flower consists of one Leaf: The Flowers are hexapetalous: The Foot-stalk of the Flower comes out from the Stalk of the Leaf: The Fruit is in Shape of an Urn, in which is contained many roundish fimbriated Seeds.

This Plant was brought from *America*, and is by some of the Inhabitants call'd, Black Snake-Root, and by others, the May Apple; I suppose, because in that Month the Fruit of this Plant is nearly ripe, and is of an Oval Shape, in some measure resembling a small Apple. We have but one *Species* of this Plant in *England*, that I know of, which is

ANAPODOPHYLLON, *Canadense Morini Tourn.* The Canada Duck's-foot of *Morin*.

This Plant is very hardy, enduring our sharpest Winters in the open Ground; it is increas'd by parting the Roots in *August*, after the green Leaves decay: It loves a moderate

dry Soil, and for the Oddness of the Plant, may merit a Place in a good Garden, altho' it is of no great Beauty.

ANATOMY, [*Anatopla* of *'Anatopva*, Gr. to dissect.] A Dissection.

Anatomy of Plants is a cutting, dividing or separating the Parts or Members of Plants, in order to discover the Size, Form, Structure, and Uses of their several Vessels, for the better promoting their Culture.

Anatomists have observed a great Similitude betwixt the mechanick Frame of Plants and Animals: The Parts of Plants seeming to bear a constant Analogy to those of Animals; and the Oeconomy, both Vegetable and Animal, seem to be form'd on the same Model.

The Parts of a Plant are the *Root*, the *Wood*, the *Bark*, and the *Pith*.

1. The *Roots* of the Plants are spongy Bodies, whose Parts are disposed for the easy Admittance of certain humid Particles which are prepared in the Ground. The Quality of the Root is found much to depend upon the Size of its Vessels and Pores.

Monsieur *Reneaume* supposes the *Root* of a Plant to do the Office of all the Parts in the *Abdomen* of Animals, which serve to Nutrition, as the Stomach, Intestines, &c.

Doctor *Boerhaave* considers the *Roots* of Plants to be compos'd of a number of absorbent Vessels, which are analogous to the *Lacteals* in Animals.

The *Root*, according to Doctor *Van Royen*, is that Part of the Plant by which the Nutrient is taken in, or that by which the Aliment is attracted, as *Theophrastus* has defin'd it: But 'tis not all that Part, which is committed to the Earth, to be nourished by the Matter that is about it, which is properly to be call'd the Trunk of the Root; this is to be referr'd rather to the Stalk or Stem, than to the Root, in that it consists of the same implicated Kinds of Vessels; but that Part that is by its Surface contiguous to the exterior Matrix, which being perforated with infinite little Mouths, promotes the receiv'd Moistures, that they may be afterwards carry'd, by Vessels not unlike to the lacteal ones, into the very Body of the Plant; this is properly to be called the *Root*.

Which Definition, although it may seem too strict, is the most general and applicable to all Plants; for it agrees as well with them which have no Root, as the vulgar Opinion is, as to those which have a manifest Root: Of the former Kind, there are but very few Plants; but of the latter a great many.

As to those that want a manifest Root, the Superficies of them is found to be perforated on all Sides with very small Holes, by which they take in their Nutrient, as in the *Pomo Aurantio*, call'd *Neptuni*, or *Pila Marina* by Fishermen, and so in these the whole Superficies serves for Roots; as is plainly seen in some stony Plants that grow under the Sea, and may be in some Sort prov'd to be deduc'd from the Analogy of Animals; for these being become

become *sui generis*, do take in Aliment, not only by the Mouth, but also the whole Skin expos'd to the moist Air, seems to serve to the same Design.

But those Plants that are endu'd with a conspicuous Root, and more obvious to the Senses, differ among themselves very much in this Part; for some are bulbosæ, some are squamosæ or tuberosæ, others grumosæ, others fibrosæ, and lastly, others nodosæ; which as it will be sufficient to have taken Notice of the primary Differences of Roots, I shall omit their particular Definition in this Place, but refer them to their several Heads, where each of them shall be particularly described.

The first Part of the Root, which is call'd the *Epidermis* or *Cuticle*, is, for the most Part, of a brown or dusky Colour, is very thin, and is easily peel'd off from the under Skin, (if it be first soak'd in warm Water) which being view'd by a Microscope, shews its most tender Structure much like a Net, pierc'd through with many small Holes. And these little Orifices of the *Epidermis* being dilated, and fill'd with the receiv'd Moisture, resemble Vesicles, which being exhausted yearly by the Mutation of the Air, become consolidated and perish; to wit, this being driven out by a new Cuticle growing under it, after the same manner as squammigerous Animals, do annually cast the old *Epidermis*, a new Cuticle coming under it, so that these little Vessels, Fibrils, or by what Name so ever they are call'd, may not unfitly be compar'd to the Veins of Animals.

But the other Part, which on the Outside constitutes the *Cortex* or outer Bark: and on the Inside the *Liber* or inner Bark, is call'd *Cutis*; in which there are Parts to be consider'd of a four-fold Kind:

1. Certain strong Fibres, cohering and elastic, stretched out vertically with the lateral Fibres communicating among themselves, and compacting [or thrusting in] the former, they form a hollow Cylinder or Zone under the *Epidermis*; and this hath another under it, which also includes a third, and so of the rest to the most inward of all, which luxuriates near the Wood, and is by a peculiar Name call'd *Liber*, or Inward Bark.

And these Zones or Girdles, although they are most innumerable, may all be peel'd off as the *Lamellæ* or Bulbs; and inasmuch as those Fibres in the harder Roots of Trees are almost of a bony Nature, they procure a Firmness to the *Cortex* or outward Bark: And these Fibres are in all Plants, and appear as well in Grass as in the Cedar-tree, although they are more compact in Trees than in Plants of a tenderer Structure, which are more easily sustain'd.

2. In the *Areas* [or Spaces] which are between the Fibres and their Anastomoses, there are every where membranaceous Vessels full of Moisture, or little Utricles, which in the *Area*, or intercepted Spaces that are of a different Figure, are found to be various and accommodated to all the Spaces: But all these Utricles communicate among themselves, as

is best seen in the greater Celandine, while we thrust out that golden colour'd Liquor with which it is filled; and the middle Spaces betwixt these Zones have like Utricles, and so all the Fibres constitute hollow Canals, but the Utricles have Receptacles communicating among themselves.

3. Aerial Vessels, or *Tracheæ* are open from the lower to the upper Part of the Plant, and are twisted or curled after an admirable manner, and disposed round about with Fibres and Utricles in Form almost of a Spiral Line, which in their Cavities contain an Elastic Air; which being affected by the external Air, first expanded and afterwards condens'd, will be chang'd after a like manner, and feel the same Vicissitudes of Cold and Heat, and so will undergo a reciprocal Motion of Cold and Heat. This Action is exerted in the Vessels fill'd with Moisture, which when they cannot be condens'd, give Place, and are driven to those that are higher, and are mov'd forward.

4. Lastly, besides Fibres, Utricles, and *Tracheæ*, a peculiar kind of Vessels appears, containing the Moistures, as it seems, secreted by the organical Disposition of the Plant itself, which water [or moisture] not only the *Cortex* but the Wood, and the rest of the Parts of Vegetables, and are turgid with a concocted Juice, which seems far more elaborate than is the Moisture contain'd in the Fibres or Utricles; and the Mouths of these Vessels being of a different Figure, pour forth sometimes a various Liquor according to its peculiar Nature, chiefly near the outward Region of the *Cortex*: So the *Tithymalus* and *Cichory* do commonly distil a milky Humour; and the Cypress, Firr and Pine, a certain Species of Turpentine.

And by how much these Circles are more outwards, by so much the middle Spaces between the two Zones are greater, and so are lessen'd always towards the more inward in a certain Proportion, which seems to depend on this; *viz.* the outward Air acting on all Sides with an equal Pressure, and so by a certain Power, presses the first or outward Zone, which by the same Power presses the second; and this also by this Means is press'd by its own condens'd Air, and presses together those which are more inward, because it cannot exert its Force upon the external Air: Therefore the second Circle is necessarily more compress'd than the first; and again, the third more than the second, and so of the rest: And the Utricles plac'd between the Circles are press'd by the same Proportion, which by degrees are more and more exhausted; thence the inner Circle loses most of all the compress'd and condensated Utricles, and by degrees grows solid.

And this is properly call'd *Liber*, [the inward Bark] and is that Circle, which being middlemost by Place, and by Nature between the *Cortex* [or outward Bark] and the Wood, comes nearest to the Nature of the Wood, and in time passes into it: For the *Cortex* loses every Year one such Circle, and becomes,

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Wood,

Wood, which may be distinguish'd from the former Circles of the Root, Stock or Trunk; and if they are cut horizontally, will shew the Number of such Circles and so how many Years the Tree is old.

And this successive Mutation of the *Cortex* into *Liber*, and of *Liber*, into Wood, is like to that we observe in the human Body in the beginning of a *Callus*; for a *Callus* consists of Skin, but so compress'd, that all the Vessels are lost, and that Skin being become solid, is increas'd and grows to a greater Bulk.

But besides these hitherto describ'd, there occur certain peculiar Vessels (of which Mention has been made in describing the *Cortex*) which are found full of Turpentine, Gum, or a certain concreted Juice proper to them, the constant Progress of which is not very conspicuous in all of them, by reason of the Transparency of the Moisture.

5. The fifth and last Part is the most inward; the *Medulla* or Pith, dispos'd in the middle Center of the Root; and as it seems different from the former, seeing this is sometimes wasted, and that never, this appears more fungous, that more durable.

As to the manner of the Root's performing its Function, it may be observ'd, that the Root having imbib'd the saline and aqueous Juices of the Earth, and saturated itself with them, for the Nourishment of the Tree, those Juices are put into Motion by Heat; which having enter'd the Mouths of the arterial Vessels from the Root, they mount to the Top with a Force answerable to what sets them in Motion; and by this Means they gradually open the minute Vessels roll'd up, and expand them into Leaves.

2. The *Wood*: This is consider'd as consisting of *capillary Tubes*, running parallel from the Root throughout the Stalk: Some call the *capillary Tubes*, *arterial Vessels*, because the Sap rises from the Root through these. The Apertures of these Tubes are, for the most part, too minute to be perceiv'd by the bare Eye, unless in a Piece of Charcoal, Cane, or the like.

Wood, says Dr. Grew, by microscopical Observations, appears to be only an Assemblage of infinitely minute Canals or hollow Fibres; some of which arise from the Root upwards, and are dispos'd in Form of a Circle; and the others, which are call'd *Insertions*, tend horizontally from the Surface to the Center, so that they cross each other, and are interwoven like the Threads of a Weaver's Web.

Besides the *capillary Tubes*, &c. before-mention'd, there are other larger Vessels, which some call *venal Vessels*, which are dispos'd on the Outside of the *arterial Vessels*, between the Wood and the inner Bark, and lead down to the Covering of the inward Root: These Vessels are suppos'd to contain the liquid Sap found in Plants in the Spring, &c.

The Reverend Mr. Hales tells us, in his excellent Treatise of *Vegetable Statics*, that in order to find whether there was any lateral Communication of the Sap and Sap-Vessels, as there is of the Blood in Animals, by Means

of the Ramifications and lateral Communications of their Vessels, he took a young Oak-Branch $\frac{7}{8}$ Inches Diameter, at its transverse Cut, 6 Foot high and full of Leaves; and having cut a large Gap to the Pith 7 Inches from the Bottom, and of an equal Depth the whole Length, and also cut another Gap 4 Inches above that on the opposite Side; he set the End of the Stem in Water, and that in two Nights and two Days time it imbib'd and perspir'd 13 Ounces; while another like Oak-Branch, somewhat bigger than that, but with no Notches cut in its Stem, imbib'd 25 Ounces.

From this, and many other Experiments he there mentions, he says, we see a most free lateral Communication of the Sap and Sap-Vessels, those great Quantities of Liquor having pass'd laterally by the Gaps, in that, by several Experiments, on Cylinders of Wood, little evaporated by the Gaps.

The *Bark* is the exterior Part of Trees, serving them for a Skin or Covering: It is generally of a spongy Texture, and communicates with the *Pith* by a Multiplicity of small Fibres passing through the *capillary Tubes*, of which the Wood consists; so that the Roots having imbib'd the proper Nutriment of the Tree, it is carry'd up by the Warmth of the Sun thro' the fine arterial Vessels of the Tree to the Top of it; and being there condens'd by the Cold, it does, by its own Gravity, return down by the Vessels, which lie between the Wood and the inner Bark, which do the Office of Veins; and as it passes by, leaves such Parts of its Juice as the Texture of the Bark will receive, and requires for its Support.

Some are of Opinion, that that soft, whitish Rind or Substance which lies between the inner Bark and the Wood, does the Office of Veins: And some call this a third *Bark*, and suppose it to differ from the other, only in that the Fibres of it are closer; and that this is that which contains the liquid Sap, Gums, &c. which are found in the Plants in the Spring and Summer Months, which hardens by degrees by means of the Sap it transmits, and is imperceptibly convey'd into the woody Part of the Tree.

The *Bark* serves for divers Purposes; for it not only transmits the nutritious Juices of the Plants, but also contains divers far oily Humours, to defend the inner Parts from the Injuries of the Weather. As Animals are furnish'd with a *Panniculus Adiposus*, usually replete with Fat, which invests and covers all the fleshy Parts, and screens them from external Cold; so are Plants encompass'd with a Bark, replete with fat Juices, by means whereof the Cold is kept out, and in Winter-time, the *Spiculae* of Ice prevented from fixing and freezing the Juices in their Vessels; whence it is, that some Sorts of Trees remain ever-green throughout the Year, by reason their *Barks* are more compact, and contain a larger Quantity of Oil than can be spent and exhal'd by the Sun.

The *Pith* is the inward central Part of a Tree or Plant, answering to the *Medulla* or Marrow

Marrow of an Animal: As for its Substance, it consists of little transparent Globules, chain'd or link'd together, somewhat like the Bubbles that compose the Froth of Liquor.

Some suppose, that the Circulation of the Sap is effected by means of the *Pith*, others by the *Bark*, and others by the *Wood*.

Borelli, in his Book *De motu Animalium*, supposes the tender growing Shoot to be distended like soft Wax, by the Expansion of the Moisture in the spongy *Pith*, which dilating Moisture, he concludes, is hinder'd from returning back, while it expands by the Sponginess of the *Pith* without the Help of Valves.

And the Reverend Mr. *Hales* is of Opinion, indeed, that 'tis very probable, that the Particles of Water that immediately adhere to, and are strongly imbib'd into and attracted by every Fibre of the spongy *Pith*, will suffer some Degree of Expansion before they can be detach'd by the Warmth of the Sun from each attracting Fibre, and consequently the Mass of spongy Fibres, of which the *Pith* consists, must therefore be extended.

And that the *Pith* may be the more serviceable for this Purpose, Nature has provided in most Shoots a strong Partition at every Knot, which Partitions serve not only as Plinths or Abutments for the dilating *Pith* to exert its Force on; but also to prevent the too free Retreat of the rarefy'd Sap from the *Pith*.

But a dilating spongy Substance by equally expanding itself every Way, would not produce an oblong Shoot, but rather a globose one, like an Apple; to prevent which Inconvenience it is observable, that Nature has provided several Diaphragms, besides those at each Knot, which are placed at small Distances across the *Pith*, thereby preventing its too great lateral Dilatation.

These are very plain to be seen, in the Shoots of the Walnut-tree, and the same may be observed in the *Pith* of the Branches of the Sun-flower, and of several other Plants; where those Diaphragms are not to be distinguished, while the *Pith* is full and replete with Moisture, yet when it dries up, they are often plain to be seen: And it is farther to be observed, That where the *Pith* consists of distinct Vesicles, the Fibres of those Vesicles are often found to run horizontally, whereby they can the better resist the too great lateral Dilatation of the Shoot.

The *Trunk* and *Branches* of a Tree bear a Resemblance to the exterior Members and Limbs of an Animal, which it may subsist without, tho' the Rotting and Mortification of them do oftentimes occasion a total Destruction of it. Accordingly the like Effects are found from the wounding or lopping of a Tree, as from the wounding or cutting off a Limb, as an Extravasation, Callus, or the like.

A *Leaf* is Part of a Plant extended into Length and Breadth, in such a manner as to have one Side distinguishable from the other. The Leaves, according to *Malpighius*, consist of so many interwoven Utricles, as to be

not much unlike a pulmonary Net, and serve instead of Lungs to the Plant, as the Perspiration and Respiration are chiefly perform'd thereby. In the Day-time, when the Heat hath rarefy'd the mounting Juices, so as to become specifically lighter than the Air, they flow out thro' the Pores of the Leaves, and do evaporate, which is the Occasion of the Leaves becoming so flaccid in very hot Weather; but in the Night, when, by the Cold, the Juices are more condens'd, then the Leaves are erected again, and do draw in a great Share of Nourishment from the Air. These Leaves we may observe to be of different Textures on each Side, the upper Surface being, for the most part, smooth, the better to shoot off redundant Moisture, while the under Surface is, many times, of a rough and cottony Texture, by which it is capable of retaining the Moisture; for which Reason we find, if by ill Management, &c. the Shoots of Trees are so nail'd to a Wall, &c. as to turn the Surfaces of the Leaves the wrong Side upwards, the Shoot is at a Stand until the Leaves have obtain'd their proper Disposition. These Leaves, as the learned Mr. *Hales* observes, are carefully distributed at small Distances throughout the whole Length of the Shoots, and serve as so many jointly acting Powers, placed at different Stations, thereby with more Ease, to draw Plenty of Sap to the extending Shoot.

A *Flower* is the more tender Part of a Plant remarkable for its Colour or Form, or both, cohering with the Rudiment of the Fruit, and contains the Organs of Generation; some of these Flowers contain the Male Organs, as the *Stamina* and *Apices*, which are loaded with the *Farina Fecundans*, which, when ripe, is scatter'd into those Flowers, which are Female, and consist only of an *Ovarium*, which is surrounded with the Petals; other Flowers there are which have both Sexes contain'd in the same Flower; these are called *Hermaphrodite Flowers*.

A *Fruit*, *Karpoc*, is not that part of a Plant which is eatable, but rather, the Seeds with their Covering should be called the Fruit. This Covering cherishes the Seeds until they come to Maturity, and so defend it from the Injuries of the Weather, as that they are not hurt thereby, and also prepare the Juices design'd for their Nourishment, that it may, with Ease, enter their small Bodies in a just Proportion.

The Motion of the nutritious Juices of Plants is produc'd much like that of the Blood in Animals, by the Action of the Air, and, in effect, there seems to be something equivalent to Respiration throughout the whole Plant.

Malpighius was the first who observed, that Vegetables consisted of two Series, or Orders of Vessels.

1. Those which have been treated of before, which receive and convey the alimental Juices, and which answer to the Arteries, lacteal Vessels, Veins, &c. of Animals: And,

2. The

2. The *Tracheæ*, or Air Vessels, which are long, hollow Pipes, in which the Air is continually receiv'd and expell'd, *i. e.* inspir'd and expir'd; within which *Tracheæ* all the former Vessels are contain'd.

Hence it follows, that the Heat of the Year, nay, of a single Day, Hour, or Minute, must have an Effect on the Air included in these *Tracheæ*, *i. e.* it must rarefy it, and of Consequence dilate the *Tracheæ*; and hence also a perpetual Spring or Source of Action must arise, to promote the Motion of the Sap in Plants.

For when the *Tracheæ* are expanded, the Vessels which contain the Juices, are, by that Expansion, press'd, and by that Means the Juice contain'd is continually propell'd, and so accelerated; and by this Propulsion, the Juice is continually comminuted, and render'd more and more subtil, and so adapted to enter into Vessels still finer and finer; the thickest Part of it being at the same time secreted, and deposited into the lateral Cells, or *Loculi* of the Bark, to defend the Plant from Cold, and other external Injuries.

The Vessels or containing Parts of Plants, consist of mere Earth, bound or connected together by Oil, as a *Gluten* or Glue; which being exhausted by Fire, Air, Age, or the like, the Plant moulders or returns again into its Earth or Dust.

Thus Vegetables being burnt by the most intense Fire, the Matter of the Vessels is left entire and indissoluble, notwithstanding its utmost Force; and of consequence is neither Water nor Air, nor Salt nor Sulphur, but Earth alone.

Juice is a liquid Substance which makes Part of the Composition of Plants, and communicates itself to all the other Parts, and serves to feed and increase them, and is that to Plants that Blood is to Animals: These Juices are of divers Sorts, aqueous, gummy, bituminous, oleaginous, resinous, vinous, of all Tastes and Colours.

This *Juice* or *Sap* of Plants, is an Humour furnished by the Earth, and changed in the Plant; it consists of some fossil Parts, and other Parts which are derived from the Air and Rain; and others from putrefy'd Animals, Plants, &c. so that consequently in Vegetables, are contained all kinds of Salts, Oil, Water, Earth, and probably, all kinds of Metals too, inasmuch as the Ashes of Vegetables, always yield somewhat which is attracted by the Load-stone.

The *Juice* enters Plants in the Form of a fine subtil Water, which by how much the nearer it is to the Root, so much the more it retains of its proper Nature, and the farther it is from the Root, the more Action it has undergone, and approaches the nearer to the Nature of the Vegetable, and of consequence, when the Juice enters the Root, the Bark of which is furnish'd with excretory Vessels, fitted to discharge the excrementitious Part, it is earthy, watry, poor, acid, and scarce oily at all.

It is further prepar'd in the Trunk and Branches, tho' it continue acid still, as is perceiv'd by the tapping or perforating of a Tree in the Month of February, when it distills a watry Juice that is sensibly acid.

The Juice being carried hence to the *Germes* or *Buds*, is more concocted, and when it has here unfolded the Leaves, these come to serve as Lungs, for the Circulation and further Preparation of the Juice; for when those tender Leaves are expos'd to the alternate Action of Heat and Cold, moist Nights and hot scorching Days, they are expanded and contracted alternately, and the more by reason of their net-like Texture.

By such Means the Juice is further altered and digested, as it is farther yet in the Perala, or Leaves of the Flowers, which transmit the Juice now brought to a further Subtlety to the *Stamina*; the *Stamina* communicates it to the *Farina*, or that Dust which appears on the *Apices*, where it undergoes a further Maturation, and sheds into the *Pistil*, and there acquiring its last Perfection, it becomes the Original of a new Fruit or Plant.

ANCHUSA, [*ἄνθος*, of *ἀνθός*, Gr. to suffocate; so call'd, on account of its having a suffocating Quality] Alkanet.

This is a *Species* of Buglos, that hath a red Root; it is brought over from the Southern Parts of France, and is used in Medicine; This Plant will grow in almost any Soil, (but delights most in a sandy light Earth); it must be sown in March, in the Place where it is to remain, for it has a Tap-root, and seldom thrives well when transplanted: These Roots with us have not that fine Colour, and are not so good for use as those brought from warmer Countries, where I suspect they are dyed.

ANDROSEMUM, *Androsomonas* [of *Ἀνδρῶν*, of a Man, and *ἄνθος* Blood, Gr.] Tutfan or Park-leaves.

This Plant grows wild in many Parts of England, and is seldom preserv'd in Gardens: It delights in shady Places, growing for the most part under Hedges of Trees.

ANEMONE, *Ἀνέμων* of *ἄνεμος*, Gr. the Wind; so call'd, because an Herb of the Wind is not open'd except the Wind blows. *Calepin*] Wind-flower.

The Characters are;

It hath a simple Stalk, which is surrounded by a Leaf: Upon the Top of the Stalk is produced one naked Flower, which consists of many Petals, (or Flower Leaves) with many Stamina or Threads in the Center; the Seeds are collected into an oblong Head, which are surrounded with a copious Down.

There are a great Variety of these Flowers preserv'd in the Gardens of the Curious Florists, which are commonly divided into two Classes, *viz.* the Broad and Narrow-leav'd Sorts: Under each of these Divisions, there are a great Variety which differ in the Shape, Colour, or Size of the Flower: To mention

mention all the particular Sorts which are preserv'd in one Garden only, would be tiresome to the Reader, and of little Use; I shall therefore proceed to the Culture of them; and first of the Soil proper to blow them to great Advantage.

Take a Quantity of fresh untry'd Earth, (from a Common, or some other Pasture-Land) that is of a light sandy Loam or hazel Mould; observing not to take it above ten Inches deep below the Surface, and if the Turf be taken with it the better, provided it hath time to rot before it is used: Mix this with a third Part of rotten Cow-dung, and lay it in a Heap, keeping it turn'd over at least once a Month, the better to mix it, and rot the Dung and Turf, and to let it have the Advantages of the free Air: In doing this Work, be careful to rake out all great Stones, and break the Clods, (but I would by no means approve of sifting or screening the Earth, which I have found very hurtful to many Sorts of Roots); for when Earth is made very fine, upon the first great Rains of Winter or Spring, the small Particles thereof join closely together, and form one solid Mass, so that the Roots often perish for want of some small Stones to keep the Particles asunder, and make way for the tender Fibres to draw Nourishment for the Support of the Root.

This Earth should be mix'd twelve Months before it is used, if possible; but if you are constrain'd to use it sooner, you must turn it over the oftner, to mellow and break the Clods; and observe to rake out all the Parts of the Green-sward, that are not quite rotten, before you use it, which would be prejudicial to your Roots if suffer'd to remain. The beginning of *September*, is a proper Season to prepare the Beds for Planting, (which if in a wet Soil, should be raised with this Sort of Earth six or eight Inches above the Surface of the Ground, laying at the bottom some of the Rakings of your Heap to drain off the Moisture; but in a dry Soil, three Inches above the Surface will be sufficient): This Soil should be laid at least a Foot thick, so that you must take out the former Soil of the Beds to make Room for it.

And observe, in preparing your Beds, to lay them (if in a wet Soil) pretty round, to shoot off the Water, but in a dry one, let it be nearer to a Level; your Earth should be laid in the Beds, at least a Fortnight or three Weeks before you plant the Roots, that it may settle; and when you plant them, stir the upper Part of the Soil about six Inches deep, with a Spade, then rake it even and smooth, and with a Stick draw Lines each Way of your Bed at four Inches Distance, so that the Whole may be in Squares, that your Roots may be planted regularly: Then with your three Fingers make a Hole, in the Center of each Square, about three Inches deep, laying therein a Root with the Eye uppermost; and when you have finish'd your Bed, with the Head of a Rake, draw the Earth smooth, so as to cover the Crown of the Roots about two Inches thick.

The best Season for planting these Roots, if for forward Flowers, is about the Middle or latter End of *September*; and for those of a middle Season, any Time in *October*; but observe to perform this Work, if possible, at or near the Time of some gentle Showers; for if you should plant them when the Ground is perfectly dry, and there should no Rain fall for three Weeks or a Month after, the Roots will be very apt to grow mouldy upon the Crown, and if they once get this Distemper, they seldom come to good after.

You may also reserve some of your *Anemone* Roots till after *Christmas* before you plant them, lest by the Severity of the Winter your early planted Roots should be destroy'd, which does sometimes happen in very hard Winters; and in Places where they are not cover'd or taken Care of; these Roots will flower a Fortnight or three Weeks after those which were planted in *Autumn*, and do many times blow equally as fair, especially if it prove a moist Spring, or that Care be taken to refresh them with Water.

But then the Increase of these Roots will not be near so great as those of your first planting, provided they were not hurt in Winter, and it is for this Reason all those that make Sale of these Roots, are forward in planting; for altho' it may happen, by sharp pinching Frosts in the Spring, that their Flowers are not so double and fair as those planted a little later, yet if they can preserve the green Leaves of the Plants from being destroy'd, the Roots will greatly increase in Bulk; but in such Gardens where these Flowers are preserved with Care, there is always Provision made to cover them from the Injuries of the Weather, by arching the Beds over with Hoops, or some such thing, and covering them with Garden Mats or Cloths, in frosty Nights and bad Weather, especially in the Spring of the Year, when their Buds begin to appear, for otherwise, if you plant the best and most double Flowers, the black Frosts and cutting Winds in *March*, will cause them to blow single, by destroying the Thrum that is in the Middle of the Flower, and this, many times, hath occasion'd People to think they were cheated in the Purchase of their Roots, when it was wholly owing to their Neglect in covering them.

In the Beginning of *April* your first planted Roots will begin to flower, which will continue for three Weeks, or more, according to the Heat of the Weather, or Management in covering them, during the Heat of the Day, with Mats or Cloths; then the second planted Sorts will come into succeed them, and these will be follow'd by those planted in the Spring, so that you may have these Beauties continued for near two Months together, or sometimes longer, if the Season prove favourable.

Toward the Middle or latter End of *May*, the Leaves of your first blown Roots will decay; at which Time you must take them out of the Ground, clearing them from the decay'd Stalks, and washing them, to take the Earth clean from the Roots, then spread them

on a Mat in a dry shady Place, till they are perfectly dry'd, when you may put them up in Bags, and hang them out of the Reach of Mice or other Vermin, which will destroy many of the Roots, if they can come at them.

Observe also to take up the latter planted Roots so soon as their Leaves decay, for if they are suffer'd to remain long after in the Ground, and there should fall some Showers of Rain, they would soon put forth fresh Fibres, and make new Shoots, when it would be too late to remove them: At the time when you take up the Roots is the proper Season for breaking or parting them, which may be done by separating those that you would choose to make all possible Increase from, into as many Parts as you can conveniently, provided each one of them have a good Eye or Bud; but those you intend to blow strong should by no means be parted too small, which greatly weakens their flowering.

The principal Colours in *Anemonies* are, White, Red, Blue, and Purple, and these in some of them are curiously intermix'd; but the most prevailing Colours amongst our *English* rais'd *Anemonies*, are White and Red; but of late we have received from *France* great Varieties of Blues and Purples, which are exceeding fine Flowers; we should therefore observe, in planting the Roots, to distribute the different Colours, so as to make an agreeable Mixture of each in every Bed, which will greatly add to their Beauty.

But since all the fine Varieties of these Flowers were first obtain'd from Seeds, no good Florist, that hath Garden Room, should neglect to sow their Seeds; in order to which, we should provide ourselves with a Quantity of good single (or Poppy) *Anemonies*, as they are call'd, of the best Colours, and such as have strong Stems, large Flowers, and other good Properties; these should be planted early, that they may have Strength to produce good Seeds, which will be ripe in three Weeks or a Month's Time, after the Flower, are past, when you must carefully gather it, otherwise it will be blown away in a short Time, it being inclos'd in a downy Substance; you must preserve this Seed till the Beginning of *August*, when you may either sow it in Pots, Tubs, or a well-prepar'd Bed of light Earth; in the doing of it you must be careful not to let your Seeds be in Heaps, to avoid which is a thing little understood, and is what I have been inform'd of by Mr. *Obadiab Lowe*, Gardener at *Battersea*, who hath, for several Years, rais'd large Quantities of these Flowers from Seeds; his manner is thus:

After having levell'd his Bed of Earth, in which he intends to sow his Seeds, he rubs the Seeds well between his Hands, with a little dry Sand, in order to make them separate the better, then he sows them as regularly as possible over the Bed; but as these Seeds will still adhere closely together, he takes a strong Hair Brush, and gently sweeps over the whole Bed, observing not to brush off the Seeds; this

Brush will so separate the Seeds, if carefully manag'd, as not to leave any entire Lumps; then gently sift some light Earth, about a Quarter of an Inch thick, over the Seeds, and if it should prove hot, dry Weather, it will be adviseable to lay some Mats upon the Bed in the Heat of the Day, and now and then give it a little Water upon the Mats, which will prevent the washing of the Seeds out of the Ground, but be sure to uncover the Bed at all times when there are gentle Showers, and as the Heat of the Weather decreases, so may you begin to uncover your Bed.

In about two Months after sowing, your Seeds will begin to appear, if the Season has proved favourable, or your Care in Management hath not been wanting, otherwise they many times remain a whole Year in the Ground. The first Winter after their appearing above Ground, they are subject to Injuries from hard Frosts, or too much Wet, against both of which you must equally defend them; for the Frost is very apt to loosen the Earth, so that the young Plants are often turn'd out of the Ground, after which a small Frost will destroy them; and too much Wet often rots their tender Roots, so that all your former Trouble may be lost in a short Time for want of Care in this Particular; nor do I know of any thing more destructive to these tender Plants, than the cold black Frosts and Winds of *February* and *March*, from which you must be careful to defend them, by placing a low Reed Fence on the *North* and *East* Sides of the Bed, which may be moveable, and only fastened to a few Stakes to support it for the present, and may be taken quite away as the Season advances, or removed to the *South* and *West* Sides of the Bed, to screen it from the Violence of the Sun, which often impairs these tender Plants.

As the Spring advances, if the Weather should prove dry, you must gently refresh them with Water, which will greatly strengthen your Roots; and when the green Leaves are decay'd, if your Roots are not too thick to remain in the same Bed another Year, you must clear off all the Weeds and decay'd Leaves from the Bed, and sift a little more of the same prepar'd good Earth, about a quarter of an Inch thick, over the Surface, and observe to keep them clear from Weeds during the Summer Season, and at *Michaelmas* repeat the same Earthing; and if your Roots succeed well, many of them will flower the second Year, when you may select all such as you like, by marking them with a Stick; but I would not have you destroy any of them until after the third Year, when you have seen them blow strong, at which Time you'll be capable to judge of their Goodness.

But if your Roots are too thick in the Seed-bed to remain, you must, so soon as their green Leaves are decay'd, sift the Earth of your Bed thro' a very fine Sieve, in order to get out the Roots, which can be no otherways found, as being small, and so nearly the Colour of the Ground; but in doing of this, observe not to disturb the Ground too deep

so as to endanger the burying any of the Roots; for notwithstanding all your Care, many small Roots will be left behind; therefore, so soon as you have sifted your whole Bed, and taken out all the Roots you can find, you must level the Earth of your Bed again, and let it remain till next Year, when you will find a plentiful Crop of Roots come up again: The young Roots which you take up must be dry'd, as was directed for the old ones, but should be planted again three Weeks before them, that they may increase in Strength, so as to flower strongly the succeeding Year.

ANEMONOIDES; [of *Anemone* and *ειδος*, Gr. i. e. the Form, or Image of *Anemone*.] *Wood Anemony*; vulgò.

The Characters are;

The Root is perennial, and for the most part grumose and creeping; the Leaves are finely cut, three of which, for the most part, surround the Stalk; it hath a single Flower upon each Stalk, which consists of many Leaves, and are expanded in Form of an *Anemone*, having many Stamina or Threads in the Middle; the Seeds are collected into an Oblong Head, and are, in Shape, like those of the *Ranunculus*, having no Down adhering to them.

The Species are;

1. **ANEMONOIDES**; flore albo. Boerb. Ind. *Wood Anemony* with White Flowers.

2. **ANEMONOIDES**; flore ex purpurâ rubente. Boerb. Ind. *Wood Anemone* with purplish Red Flowers.

3. **ANEMONOIDES**; flore majore, intensiore cæruleo, Boerb. Ind. *Wood Anemone* with large deep Blue Flowers.

4. **ANEMONOIDES**; flore albo pleno. Boerb. Ind. *Wood Anemone* with double White Flowers.

5. **ANEMONOIDES**; flore pleno purpureo. Boerb. Ind. *Wood Anemone* with double Purple Flowers.

6. **ANEMONOIDES**; flore pleno cæruleo majore. *Wood Anemone* with large double Blue Flowers.

The first of these Plants is found wild in the Woods in most Parts of *England*, the other Varieties I have gathered in great plenty, in the Wildernesses belonging to the Gardens at *Wimbleton* in *Surrey*, which were, probably, at first taken from some Woods in *England*; in this Place they increase so fast, that the Surface of the Ground is cover'd with them in the Spring; and what is more remarkable, that there the large blue and double Sorts are the most common: These Plants are very pretty Ornaments to Wilderness Quarters, or shady Walks in the Spring of the Year, continuing a long Time in Flower, and by their agreeable wild Appearance, have a very pleasing Effect on the Eye.

The best Season for transplanting these Flowers is in *May*, when the Leaves are decaying; for if they are suffer'd to remain until the Leaves are quite gone, it will be very difficult to find their Roots, which are nearly the Colour of the Earth: If these Roots are

permitted to remain in a Garden undisturb'd, they will multiply exceedingly, and produce great Quantities of Flowers; but if they are often remov'd, it will destroy them; therefore they should be planted in such shady Parts of Wildernesses as are seldom digged.

ANEMONOSPERMOS; [of *Anemone* and *σπέρμα*, Gr. Seed, because the Wind easily bears away the Seed.]

The Characters are;

It hath an hemispherical scaly Cup; The Flower is radiated like the *Ragwort*; but the Seeds are copiously surrounded with a pappus Down, as are those of *Anemone*.

The Species are;

1. **ANEMONOSPERMOS**; *Africana*, folio *Jacobææ*, flore luteo, extus puniceo. Boerb. Ind. The *African Anemonospermus*, with Leaves like *Ragwort*, and Flowers which are yellow within, and red on the outsides.

2. **ANEMONOSPERMOS**; *Africana*, folio, *Cardui Benedicti*, florum radiis intus albicantibus. H. A. The *African Anemonospermus*, with Leaves like the *Blessed Thistle*, and the Rays of the Flower are white on the Inside.

3. **ANEMONOSPERMOS**; *Africana*, folio *Jacobææ* tenuiter laciniato, flore aurantio pulcherrimo. Boerb. Ind. The *African Anemonospermus*, with slender divided *Ragwort*-leaves and fair Orange-colour'd Flowers.

4. **ANEMONOSPERMOS**; *Africana*, folio & facie *Taraxaci incanis*. Par. Bat. Zipp. The *African Anemonospermus*, with Leaves like *Dandelion*, but are hoary.

These Plants were originally brought from about the *Cape of good Hope* into the curious Gardens in *Holland*, where they have been propagated, and from whence they have been distributed, into the several Parts of *Europe*, where they are now growing.

They are propagated by planting Cuttings of them in a Bed of light fresh Earth, in any of the Summer Months, observing to shade them from the Heat of the Sun until they have taken Root, as also to refresh them often with Water, and in six Weeks or two Months after planting, they will be rooted sufficiently; at which Time, you should transplant them into Pots fill'd with the like fresh Earth, setting the Pots in a shady Place until the Plants are settled in their new Earth: After which Time you should expose them to the open Air until the latter End of *October*, or later, according as you find the Weather is favourable, when you must remove the Pots into the *Green-house*, where they should be plac'd as near the Window as possible, that they may have a good Quantity of free Air at all times when the Weather is mild; nor should they be over-hung by other Plants, which would occasion them to take a Mouldiness, and rot; you must also frequently refresh them with Water, but give them but a little at each Time during the Winter-Season; but in Summer they will require a greater Plenty, as also to be often repeated.

These

These Plants being pretty hardy, are only hurt by great Frosts, they may therefore be kept in the same House with *Myrtles*, and also expos'd in the Summer with them; they will require to be shifted out of their Pots twice every Year, viz. in the beginning of *June*, and again in *August*: At which Times you should cut off a good Quantity of the Roots round the Outside of their Balls, (but be very careful not to shake the Earth intirely from the Roots); and at these times you should prune off the straggling Branches, the better to form their Heads into a regular Figure, but do not shorten their Branches, for that would cut off their Flower-Buds.

The 4th Sort is annual, and therefore only to be propagated by Seeds, (which Way also the other Sorts may be increas'd, if we have good Seeds, which are but rarely obtain'd in *England*): The Seeds should be sown on a moderate Hot-bed in the Spring; and when the Plants are come up, they should be transplanted into Pots of fresh Earth, and plung'd into another very moderate Hot-bed to bring them forward, and afterwards expos'd to the open Air by degrees: But the fourth Sort is very subject to be destroy'd by small Insects, which prey upon the Plants; you should therefore carefully wash them off whenever they appear thereon.

The three first Sorts should be frequently renew'd from Cuttings, for when they grow old, they are very subject to decay in Winter, by which the Species are sometimes lost, where it hath been neglected to raise young Plants.

They are all very pretty Ornaments to a Green-house, for their Flowers are produc'd in almost every Month of the Year, which, together with the Diversity of their Leaves, greatly adds to the Variety, when intermix'd with other Plants.

ANETHUM; Dill [*ἄνηθον*, which some will have call'd *ἀνίκητος*, i. e. Invincible, because it excites an Appetite to Food; others of *Παρά τὸ ἀνωδέον*, from its quick Growth.]

The Characters are;

It hath a slender fibrose annual Root: The Leaves are like those of *Fennel*; the Seeds are oval, plain, streaked, and bordered.

The Species are;

1. **ANETHUM**; *bortense*. C. B. Common or Garden Dill.

2. **ANETHUM**; *verum*, *Pernambucense*. Zan. The true Dill of *Pernambuco*.

3. **ANETHUM**; *segetum*, *semine minori*. Virid. Lusit. Corn Dill, with lesser Seeds.

The first of these Sorts is that which is cultivated for Use; the other two are Varieties, which are preserv'd as Curiosities in Botanick Gardens.

These Plants are propagated by sowing their Seeds early in the Spring in light rich Earth, where they will come up, and grow very strong in a short Time, provided they have Room; therefore the better Way is, when the Plants are come up, to hoe them out, as is practis'd

for Onions, Carrots, &c. leaving the Plants about eight or ten Inches asunder every Way, observing to keep them clear from Weeds; and when the Seeds begin to be form'd you should cut up those that are intended to be put into the Pickle for Cucumbers, leaving those that are intended for the Use of the Seeds, until they are ripe; at which Time it should be cut, and spread upon a Cloth to dry, and then beat out for Use: And if you let the Seeds fall upon the Ground, they will arise the next Spring without any Care, so that the Trouble of sowing their Seeds may be spar'd.

ANGELICA [of *Angelus*, so call'd, as some Quacks, &c. pretend, from the Angels, on account of its excellent Qualities; for it is pretended, when the Army of a certain Emperor was miserably afflicted with the Plague, an Angel admonish'd him in a Dream to make use of this Plant, by which Means he sav'd his Army.]

The Characters are;

It hath winged Leaves, which are divided into large Segments: The Stalks are hollow and jointed; the Flowers (which grow in an Umbel upon the Tops of the Stalks) consist of five Leaves, and are succeeded by two large channell'd Seeds.

The Species are;

1. **ANGELICA**; *sativa*, C. B. Common or Manur'd *Angelica*.

2. **ANGELICA**; *sylvestris*, major. C. B. Greater wild *Angelica*.

3. **ANGELICA**; *lucida*, *Canadensis*. Corn. Shining *Canada Angelica*.

4. **ANGELICA**; *Montana Perennis*, *Aquilegiae folio*. Tourn. Mountain Perennial *Angelica*, with Columbine Leaves.

There are several other Species of this Plant which are preserv'd in the curious Botanick Gardens; but as there is at present no particular Uses which these are apply'd to, so it would be needless to enumerate them here.

The Common *Angelica* delights to grow in a very moist Soil: The Seeds of this Plant should be sown soon after it is ripe, for if it is kept until the Spring, seldom one Seed in forty of it will grow. When the Plants are come about six Inches high, they should be transplanted at a large Distance, for their Leaves extend very wide: The best Place for this Plant is upon the Sides of Ditches, or Pools of Water, where being planted about two Feet asunder, they will thrive exceedingly. The second Year after sowing, they will shoot up to flower; therefore, if you have a mind to continue their Roots, you should cut down these Stems in *May*, which will occasion their putting out Heads from the Sides of the Roots, whereby they may be continued for many Years; whereas, if they had been permitted to seed, their Roots would perish soon after.

The Gardeners near *London* propagate great Quantities of this Plant, for which they have a great Demand from the Confectioners, who make

make a Sweet-meat with the tender Stalks of it, cut in *May*.

This Plant is also used in Medicine, as is also the Seeds; therefore where it is cultivated for the Seeds, there should be new Plantations annually made to supply the Places of those which die.

The second Sort grows wild by the Ditches Sides in many Parts of *England*, and is rarely propagated in a Garden.

The other two Sorts may be propagated by sowing their Seeds in the manner as was directed for the common Sort, but should be planted in a drier Soil.

ANIL; [is so call'd by the Inhabitants of all the different Countries where it grows] The Indigo Plant.

The Characters are;

It hath pennated (or winged) Leaves, which are terminated by a single Lobe at the Extremity; the Flowers (which are for the most part dispos'd in a Spike) consist of five Leaves, and are of the Papilionaceous Kind, the uppermost Petal (or Standard) being larger than the others, and is rounder and lightly furrow'd on the Side; the lower Leaves (or Petals) are short, and terminate in a Point: In the Middle of the Flower is situated the Style, which afterwards becomes a jointed Pod, containing one Cylindrical Seed in each Partition.

The Species are;

1. ANIL; five *Indigo Americana, siliquis in falcula modum contortis.* D. Merchand. Mem. Ac. Reg. Scien. Anno 1718. The true Indigo, with Pods, shap'd like a Sickle.

2. ANIL; five *Indigo Americana, fruticosa, argentea, floribus è viridi purpureis siliquis falcatis.* *Colutea affinis, fruticosa argentea floribus spicatis è viridi purpureis siliquis falcatis.* Sloan. Cat. Jam. The wild Indigo; vulgò.

3. ANIL; five *Indigo, siliquis latis aliquantulum incurvis.* Emerus, Indicus, *siliqua aliquantulum incurva; ex quo Indigo.* Breyn. Indigo with broad Pods a little crooked.

The first and third of these Species are Annuals with us; the Seeds of these must be sown on a Hot-bed in the *Spring* of the Year; and when the Plants are come up two Inches high, they should be transplanted into small Pots filled with good fresh Earth, and the Pots plung'd into a Hot-bed of Tanners Bark; and when the Plants have obtain'd some Strength, they must have a great deal of free Air, by raising the Glasses in the Day-time, and in *June* they may be expos'd to the open Air, by which Time they will produce their Flowers, which will be succeeded by Pods in a very short Time after, and in *August* their Seeds will be perfected.

The second Sort grows to the Height of five or six Feet, and will abide two or three Years (if it is preserv'd in a very warm Stove in Winter: This produces Spikes of Flowers from the Wings of the Leaves on the Sides of the Stems of the Plant, and doth sometimes perfect its Seeds in *England*. This must be

raised in a Hot-bed, as was directed for the two former, but must not be expos'd to the open Air, even in the hottest Weather.

The first and third Sorts are suppos'd to be promiscuously used to make the *Indigo*; but the first is the common Sort, which is cultivated in the *English* Plantations in *America*: But I have been assured by a Person of great Credit, that he has made as good *Indigo* from the second Sort, as any that was produced in our Plantations; and this being a much larger Plant, will afford a greater Quantity from the same Compass of Ground, than any of the other two Species; and this Sort is also much hardier, and may be cultivated in such Places where the first Sort will not grow, by which Means great Improvements may be made with this Plant in our *American* Plantations.

The whole Process in making the *Indigo* being exactly describ'd by *Pere Labat*, in his Voyages, I thought it would not be unacceptable to the *English* Reader, to translate his Account in this Place, which is as follows.

There was (says he) formerly much *Indigo* made in the Parish of *Macouba*; there is neither Stream nor River where we find the Work-houses for *Indigo*; that is to say, the Boats or Vats built with Bricks or Stones, and well cemented, where they put the Plant to digest from which they draw this Colour.

There are three of these Vats commonly built one above another, in Form of a Cascade, in such a Manner, that the second is much lower than the Bottom of the first, that it may receive the Liquor contain'd in the first, when the Holes are unstopp'd which are contriv'd in the Bottom of the first; and then the third also receives in like manner that which the second contain'd.

The first, which is the largest and highest of these Vats, is call'd the Soaker or Boiler, which is commonly made twenty Feet long, and about twelve or fifteen Feet broad, and three or four deep. The second is call'd the Battery; this is little more than half as big as the first. The third, which is much less than the second, is call'd the Young Devil.

The Names of the two first agree perfectly to their Uses, because they put the Plant into the first, where it ferments, is soak'd, and becomes rotten like Dung; after the Salt and Substance of the Leaves and Bark are extracted by the Water, in the Fermentation which was excited by the Heat of the Plant.

Then in the second they stir and beat the Water which is impregnated with the Salt of this Plant, until it is collected, united, and coagulated the one with the other, which forms the Particles which compose the Tincture.

But as for the Name of the third, I can't see how it well agrees with it, unless it be because this Vat is more coloured than the two others, which is caus'd by the *Indigo* (which is already form'd) remaining, which must consequently give it a much deeper Colour.

This last Vat is also call'd at *St. Domingo*, a Settler, to which Name it agrees perfectly well, seeing it is in that which the *Indigo* be-

gun in the Soaker, and perfected in the Battery, where 'tis united into a Mass, is separated from the watry Parts which swim on the Top, and this settles to the Bottom of the Vat, from whence it is drawn to be put into the Bags, and afterwards into the Cases, as we shall hereafter mention.

We ought never to be sparing in the Building and Solidity of these Vats; for the Strength of the Fermentation being very great, the Brick-work at least, and the Plaistering, should be very well done, and the Cement chosen and work'd with great Care, or else they will crack; and in case there be but a very little Slit, one of these Vats of *Indigo* will run out, which will be a considerable Loss to the Proprietor.

When this Mischieff happens, we shall shew you an easy and infallible Remedy, which I can answer for, having experienc'd it. Take of some strong sort of Sea-shells, which should be pounded (without baking them) and reduc'd to a Powder, and sifted very fine. Take also the same Quantity of slack'd Lime, and sift it, mix those two together with a sufficient Quantity of Water to make a strong Mortar, and with this stop the Slits of your Vats with great Diligence. This Mixture will incorporate and dry in a very short Time, and immediately prevent the Matter from getting out of the Vat.

All the World knows, or ought to know, that *Indigo* is a Dye with which Wooll, Cloth, Stuffs and Silks are dyed Blue.

The *Spaniards* call it *Anillo*. The finest which they make in *New Spain*, comes from *Guatemala*, the which being well made, is simply call'd from the Men *Guatemala*. This is also made in the *East-Indies*, particularly in the Empire of the *Great Mogul*, or the Kingdom of *Golconde*, and other Places thereabouts, as *Monf. Tavernier* has related in his Voyages. We call this in *Europe*, most commonly from *India*, *Indigo* or *Anil*, taking for the proper Name, the Name of the Country where it was made.

Some Authors, and amongst the rest my Brother, *Pere du Tertre*, have imagin'd, that that which comes from the *East-Indies*, is much handsomer, finer, and dearer than that which comes from the *West-Indies*, to which they give the Name of *Flat Indigo*, whilst they give that of *Indigo* only to that which comes from the *East-Indies*. They would have spoke more justly if they had call'd the last *Round Indigo*; for, by their Leave, all the Difference there is between the two *Indigo's*, is, that that which is made in the *East-Indies* is form'd like half an Egg, and that of the *West-Indies* is like a Lozenge; for as to the Goodness and Beauty, the one will not reproach the other, when they are made with equal Care, and the same Fidelity.

The Figure of the *Indigo* which is made in the *East-Indies*, obliges the Merchants, when they would transport it into *Europe*, to pound it, that they may put a greater Quantity in the Cases or Barrels in which it is inclos'd. It is certain, that being so pounded, its Grain, which was broken under the Pestle, and re-

duc'd to a Dust, is render'd much finer than that from the *West-Indies*, which comes in Cakes, as it was dried, with its Grain intire, and therefore consequently appears less fine; but what doth that signify as to the intrinsic Goodness of the Merchandize? I maintain it is the same in both, altho' there appears that Difference.

For to be convinc'd of this Truth, take a Lump of Sugar equally White all over, break it, and pound one Piece to a Powder, this shall appear much whiter than that which was left intire; this proceeds from the Grain of the one being divided into a greater Number of Parts, which, altho' very small, and almost insensible, yet are not without a greater Quantity of Superficies, and consequently do reflect more Light; whereas the other being left whole, appears a large Grain, and having little Superficies, consequently reflects less Light, and so of Consequence will appear less white: It is also the same Thing, when it appears less fine, altho' it is in the Whiteness that the Beauty of the Sugar consists: we can in like manner give the same Reason for the *Indigo*, and say, that all Things being equal, that of the *West Indies* is as fine as that of the *East*, when both are equally well made.

I believe we ought to add, That that of *America* is better for Use than the other; for don't we see, that we can't pound this Dye without the subtle Parts dissipating in the Air, as *Monfieur Tavernier* agrees; and who can doubt, that these Parts are not better, and that they abound more when they are put in Motion.

I agree, that the *Indigo* which comes from the *East-Indies*, is much dearer than that which is made in the *West*; the Reason is evident, it comes from a greater Distance, the Hazard is greater, and those who bring it do not find their Accompt in it, if they sell it for the same Price as those who bring it from a much nearer Place; but that doth not in the least prove that it is finer or better.

Indigo is compos'd of the Salt and Substance of the Leaves and Bark of a Plant of the same Name; so that we can say, that it is the Dissolution or Digestion of the Plant, caus'd by the Fermentation that is excited in the Water where it is put to soak.

I know that some Writers pretend, That the Substance of the Leaves doth not produce the *Indigo*, which, according to them, is a Dye, or viscous Colour, which the Fermentation of the Plant diffuses in the Water; but before we believe them upon their Word, I will inform them, that this comes from the Substance of the Plant; for when we draw it from the Soaker, it is certain, that it is not more, nor the same Weight, nor the same Consistence, nor of the same Colour that it had before. The Leaves, which were well nourish'd, and very full of Juice, are light, flabby, and wither'd, and more like Dung than any thing else; and this is what has occasion'd the commonly giving the Name of *Rotter* to the Soaker. If then we find not in the Leaves, and in all the other Parts of the Plant, the same

same Substance which there was before it was put a soaking; is it not natural to believe, that it is the same Substance, the same Salt, which being separated from its Covering, and being diffus'd in the Water, thickens, and forms by its Union or Coagulation, this Mass of Blue Colour, to which we give the Name of *Indigo*, so useful to Painters and Dyers?

The Culture of the Plant by *Pere Labat*.

This Plant requires a good rich level Soil, and which is not too dry, for it greatly impoverishes the Ground where it grows, and should be sown by itself, for we cannot take too much Care in clearing all other Herbs from amongst them, let them be of what Nature soever.

They weed and clean the Ground, where they plant the *Indigo* Seeds, five times: It appears to me they ought to say, Sow it; but the Term of Planting is consecrated in our Isles, and I do not believe it my Duty to fall out with our Inhabitants for a Word esteem'd in abundance of Places, altho' in this Custom, or Use, we murder the *French* Tongue. They carry sometimes this Neatness a great Length, as in sweeping the Ground, as they sweep a Chamber; after that they make Drills or Trenches, wherein they put the Seeds, for which Purpose the Slaves, or others, who do this Work, range a Line at the Beginning of the Ground, and walking backward, draw little Trenches the Width of their Hoes, and about two or three Inches deep, at equal Distances from each other, at about a Foot asunder, and in a Line as strait as possible.

When they are come to the End of the Ground, each of them being provided with a little Bag of Seed, and returning back again, they put the Seeds into the little Trenches; and when they have put in eleven or thirteen Seeds, they stop, from a superstitious Notion, that there is something in an odd Number: I never regarded or approv'd of this Practice, nor did I trouble my self to go about to convince them of the Uselessness and Ridiculousness of this Practice, because I believe I should lose my Labour.

This Labour is the most troublesome of any in the Manufacturing of the *Indigo*, for those who plant it must always stoop, without rising up, until the Plantation of the whole Length of the Piece is done, which, when it is great, as it almost always is, they are oblig'd to remain two Hours, and often more, in this Posture.

When they arrive at the Top of the Piece, they return back again, and fill up the Trenches where they have put in the Seed, thrusting in the Earth with their Feet, which they had drawn out, and so the Seed will be covered about two Inches thick with Earth.

Altho' all Seasons are good for planting the *Indigo*, we must, however, be very careful of putting it in the Ground in a dry Time; it is true, that the Seed may keep good a Month under Ground without spoiling, but then the Plant is at the same time expos'd so, that we see it is drawn out of the Ground by Vermin, or the Wind, or choaked by the Weeds which

grow with them, in such a manner, that the wise Inhabitants never hazard the planting of it dry; that is to say, in a Time when probably there are no Hopes of Rain in two or three Days after the Plantation is finished. They commonly chuse a moist Time, which promises Rain, and then they are sure to see the Plants come up in three or four Days after the Seed is sown.

Some Precaution they take to clean the Ground where these Seeds have been sown; for they must not sleep when the *Indigo* is out of the Ground, because, the Goodness of the Soil, together with the Moisture and Heat of the Climate, as also the great Quantities of Dew which fall in the Night, cause a prodigious Quantity of Weeds to come up, which would choak and absolutely spoil the *Indigo*, if they are not extreme careful to weed it as it appears, and keep up the Plant with an extraordinary Neatness; and these Weeds often are, in part, the Cause of breeding a certain kind of Caterpillar, which will soon devour all the Leaves.

After the Plant is come up, in two Months it will be perfectly mature, when it will be in a proper State to cut; if we stay longer till it flowers, the Leaves become dry and harder, and consequently will afford less Substance, and the Colour will not be so fine.

After this first Cutting, we can continue to cut the new Branches and Leaves that are produc'd every six Weeks, or thereabouts, supposing it a rainy Season, and that we are careful not to cut it in a dry Time, because that will infallibly spoil the Plant, or, as we say in the Country, abuse it, and then we shall be oblig'd to replant it; but all Things being well manag'd, the Plant will last two Years after it is planted.

The Plant being arriv'd to its Maturity, which is known by the Leaves becoming more brittle, and less pliable, they cut it some Inches above Ground. They use for this Cutting, large crooked Knives, made in Form of Sickles. Some of the Inhabitants make it up into Bundles, like a double Bottle of Hay, that a Negro may more easily carry it to the Soaker, but the greatest Part of them put it into large Pieces of coarse Cloth, which they fasten at the four Corners, which is more commodious; the Plant less handled and fouled, and those which are small are as safely carried as the large, and these work with more Diligence than those which tie it in Bottles; and as Time is very precious all over *America*, we can't be too careful not to waste it.

Eighteen or twenty Parcels of the Herb, each of the Bigness of two Bottles of Hay, or thereabouts, are sufficient to fill one Soaker of the Bigness I have before given; then this must be filled with Water, so as to cover the Herbs, then put some Pieces of Wood on the Top, to prevent the Herbs from swimming on the Top of the Water, pretty close, as is practis'd on Grapes when they are put into the Press, then leave the whole to ferment: According as the Heat is greater or less, and the Plant is more or less ripe, the Fermenta-

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tion is sooner or later, sometimes in six, eight, or ten Hours, and sometimes we are oblig'd to wait eighteen or twenty Hours. It is very rare that it is any longer.

Here the Effects of the Fermentation may be observ'd; the Water heats and bubbles up on all Sides, as Grapes in a Vat; and the Water, which at first was clear, thickens insensibly, and becomes of a blue Colour, inclining to a Violet.

Then, without meddling with the Herbs at all, they open the Spiggots (or Plugs) which are at the Bottom of the Soaker, and let out into the Battery, this Water charg'd with the Salts and Substance of the Plants that the Fermentation has detach'd; and at the same time they throw away the Herbs that are in the Soaker, as good for nothing, and, as it were, rotten, and cleanse it out, in order to fill it again with fresh Herbs, then they beat the Water which was let out of the Soaker into the Battery.

In former Times they made use of a Wheel of Battledoors or Slices, the Axis of which was plac'd in the Middle of the Vat, which they turned by two Handles plac'd at the Top of the Axis.

Instead of these Battledoors they afterwards put small Carriages in the Bottom, and after these others, the Bottom of which were bor'd full of Holes with an Augur.

At present they make use of a large kind of Buckets, tied to long Rods placed upon Chandeliers, by means of which, the Negroes raise the Water, beat it, and stir it violently and continually, until the Salts and other Parts of the Substance of the Plant are united together, and, as it were, coagulated sufficiently to make a Body.

The observing the critical Minute, discovers the chief Art of the *Indigo* Maker; for if they should leave off beating never so little too soon, the Grain, which is not yet form'd, would remain expanded in the Water without sinking and gathering at the Bottom of the Vat, and would be lost along with the Water, when they are oblig'd to let it out, which would be a great Loss to the Owner; and if they should continue to beat it after it is form'd, the same Inconveniency would happen; and therefore they are oblig'd to nick the very Moment, and as soon as they find that, leave off beating, and let the Matter rest.

They use for this Purpose a little Silver Cup, design'd only for this Use, which they fill with this Water, during the Time the Negroes are beating it, and according as they observe that the *Fæces* do precipitate to the Bottom of the Cup; where, as they remain distributed, they cease or continue to beat it.

The *General Dictionary* printed at *Trevoux*, relates very seriously, upon the Credit of Father *Plumier* the *Minim*, that the *Indigo* Makers having taken the Water out of the Battery into the Cup, do spit in it; and if the *Indigo* be form'd, the *Fæces* fall down presently to the Bottom of the Cup, and then they leave off beating; but if not, they continue it.

This is not the only Instance in which they have abus'd the Credulity and Simplicity of Father *Plumier*, as I have been a Witness upon other Occasions, and, perhaps, shall mention some in these Memoirs.

This they do to expose those who would give Relations of a Country that they have not seen but *en passant*, and as if they were running through it; they often apply themselves to such as know but little of the Matter concerning which they would be inform'd, and such as chuse rather to proclaim their Folly, than appear to be ignorant; and oftentimes they happen to fall into the Hands of Banterers, with which this Island is well stor'd, who take a Pleasure in exposing Persons to Ridicule, when Opportunity offers.

I have scarce known a Man easier to be impos'd upon than this Father; he had a wonderful Talent at designing Plants, and was in a Condition to have rendred this Work compleat in its Kind, if he had stopp'd there; but he fell into an infinite many Mistakes, by going out of his Sphere, of which this here mention'd is not the most considerable.

After they have left off beating it, they let the Matter rest, the Dregs precipitate to the Bottom of the Vat, and there gather together like a kind of Clay, and the Water, discharg'd of all these Salts, and of which it was impregnated, swims on the Top, and clarifies itself.

Then they open the Plugs that they have contriv'd at different Distances from the Bottom, and let the Water run out; and when it is come to the Superficies of the *Fæces*, they open the Plugs at the Bottom, that all the *Fæces* may run into the Little Devil, or Vessel where they are to rest.

Here they leave it to settle a little longer, and afterwards put it up into Cloth Bags, fifteen or sixteen Inches long, made tapering to a Point, where it finishes its purging itself from the rest of the Water, which, till then, remain'd in its Particles.

When this is done, they spread it in Cases, or Waggon, three or four Foot long, and two Foot wide, and about three Inches deep, and expose it to the Air to dry thoroughly; they take Care not to expose it to the Sun, because that would exhaust the Colour in drying it; and they are very careful to keep it from the Rain, for that would dissolve it, and spoil it intirely.

It often happens that the Caterpillars get in among the *Indigo*, and in that little Time they are suffered to be there, they eat up the Leaves, and often the Bark and Tops of the Branches, and cause the Stocks to die: It would be losing Time to go about to destroy them, and hinder them from ravaging one intire Piece, in cutting a Trench. The surest Way is to cut the *Indigo* immediately, and to throw it pell-mell into the Soaker, Plants and Caterpillars and all together, and the Caterpillars bursting will give up what they have gorged, and the *Indigo* will be never the worse.

It is true, that when the Plant has not come to its full Maturity, it yields a great deal less; but it has been prov'd, by many Experiments, that the Colour produc'd from it is much finer, so that what is lost by the one is gain'd by the other.

I would not wait for the Plant's coming to its full Maturity before I cut it: Perhaps the whole of the Secret of those who boast of their *Indigo*, to the Prejudice of ours, lies in nothing else but cutting the Plant at the Time when it gives the brightest Colour.

I have experienc'd, that leaving the *Cochineal* upon the prickly Pears, which were too ripe, instead of being red, became of a *Feuilmort* Colour, as the Fruit of which they were fed; the same Thing may, very likely, happen to the *Indigo*; and what I propose here is not a Doubt without a Foundation, in that it is supported by certain Experience, which I am going to relate, and proves plainly, that the same Plant, cut at different Ages, produces Colours different in Beauty.

I would not venture to give this Counsel to People that are attach'd to their Interest, or who regard more the Quantity than the Quality of their Merchandize; but, I suppose, having nothing to fear from our Inhabitants of the Isles, who are generous and magnificent, oftentimes beyond their Ability; I advise them to make different Trials of the Earth, the Season, the Age of the Plant, the Water which they use to steep it in, and the Point of Dissolution, &c.

And I am certain, in a little Time, with Labour and Patience, they would make *Indigo* not only equal to, but also surpassing that which is made in the Country of Foreigners, of which they boast so much.

The Inhabitants of *Domingo* know, that in 1701. their Sugar was rough, and of a very bad Quality, and that they did not make it without a great deal of Pains; and all the World will own, that now, by their Labour, Assiduity, and Experiments, it is become as much, nay, more in Esteem than that of the *Leeward* Islands: And why may not the same Thing be hop'd for as to the *Indigo*?

The *Sieur Pomet*, Author of the *General History of Drugs*, says, in his *First Part*, Cap. 10. That the *Indians* of the Village of *Sarquesse* near *Amadabat*, make use of nothing but the Leaves of the *Indigo*, and throw away the Plant and the Branches, and that by this Means the *Indigo* is made that is most esteem'd.

I am much of his Mind; for we see that those People who take the Pains to pick off the Grapes before they put them into the Vat, and who throw away intirely the Stalks, make a Wine much better, because the Stalks always contain an Acid, which mingles with the Juice of the Grapes, in treading and pressing them both together.

And by a like Reasoning the Plant of *Indigo* ought to contain a Liquid much less perfect in Colour, than that which is in the Leaves; but this requires Patience and Time for the *Indians* to undertake such a Work, and to find

Workmen; as also a better Market than they have in this Country.

Suppose the Fact to be true, as the *Sieur Pomet* has written, upon the Report of the *Sieur Tavernier*, although I love to make Experiments that may be able to bring our Manufactures to a higher Degree of Perfection, I would not presume to propose it; because the Expence of those who would make it, and the Profit that they would draw from it, perhaps, would not pay the Cost: But however, I have given the Practice of the *Indians* of *Sarquesse*, that I may not be reproached for having omitted any thing that may be of Advantage to my Nation.

The good *Indigo* ought to be so light, that it will float upon the Water; the more hollow it is, the more it is to be suspected to have a Mixture of Earth, or Ashes, or Slate pounded; the Colour ought to be of a deep Blue, inclining to a Purple, brilliant, lively, glittering; it ought to look finer within-side than without, and shining like Silver.

If it be too heavy according to its Bulk, it ought to be suspected and challenged, and search'd to discover its Quality; for as it is often at a considerable Price, it is fit that those that buy it should be advertis'd of the Frauds that may be committed in it.

The first is the beating the Plant too much in the Steeping-Vat, so as to consume the Leaves intirely, and also the Bark of the Plant: It is certain that this considerably augments the Quantity of the Matter by the Dissolution, but the *Indigo* is not near so good; it is blackish, lean, heavy, and fitter to be thrown away than used.

The second is to mix a sort of ash-colour'd Earth and a certain brown shining Sand, which they find very commonly in the Beaches on the Sea-shore.

And above all, the powder'd Slate in the *Fœces*, which they throw in such a Quantity as it falls into the Little Devil, being well stirred in, to make it incorporate, and which Fraud does not appear.

And this Fraud is committed more easily in the *Indigo* which is in Powder than that which is in Cakes, because it is very difficult for these strange Bodies to joyn together so well as that it does not appear in several Places, as Beds of different Matter, which in breaking off a Piece of the *Indigo*, is easily observ'd.

There are two Expedients to try the good or bad Quality of *Indigo*. The first is, to put a Bit of it in a Glass of Water, and if it be pure and well made, it will dissolve intirely; but if it be falsify'd, the foreign Matter will sink to the Bottom of the Glass. The second is in burning it: The good *Indigo* will burn all away, instead of leaving Ashes, Earth, Slate, &c. after that which is true is consum'd.

The *Indigo* was sold in the *Leeward* Islands in 1694. from three Livres ten Sols to four Livres a Pound, according to its Beauty, and the Number of the Vessels that were freighted with it.

I have since seen it sold much under that Price; be that as it will, the Inhabitants make
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a very considerable Profit, when they sell it for no more than forty Sols a Pound; for that they are at much less Expence in this Merchandize than in the Sugar Trade.

ANISUM or **ANISE**. *Vide* Apium.

ANONA.

The Characters are ;

It is a Tree growing to the Height of an Apple-tree ; the Leaves are, for the most part, single and oblong ; the Flowers do, for the most part, consist of three thick, narrow Petals, or Flower-leaves, and are produc'd single upon their Foot-stalks ; these Flowers are succeeded by conical, squamous, or netted Fruit, which have a pulpy Substance surrounding the Cells, in which are contain'd oblong hard Seeds.

The Species are ;

1. **ANONA** ; *maxima, foliis latis splendens, fructu maximo, viridi, conoide, tuberculis seu spinulis innocentibus aspero.* Sloan. Cat. Pl. Jam. The Sour-Sop ; *vulgô.*

2. **ANONA** ; *maxima, foliis oblongis angustis, fructu maximo, luteo, conoide, cortice glabro, in areolas distincto.* Sloan. Cat. Pl. Jam. The Custard-Apple ; *vulgô.*

3. **ANONA** ; *foliis odoratis minoribus, fructu conoide squamoso, parvo dulci.* Sloan. Cat. Pl. Jam. The Sweet-Sop ; *vulgô.*

4. **ANONA** ; *aquatica, foliis laurinis atrovirentibus, fructu minore conoide luteo, cortice glabro in areolas distincto.* Sloan. Cat. Pl. Jam. The Water or Sweet-Apple ; *vulgô.*

5. **ANONA** ; *foliis subtus ferrugineis, fructu rotundo majore, lævi purpureo, semine nigro, partim rugoso, partim glabro.* Sloan. Cat. Pl. Jam. The Star-Apple ; *vulgô.*

6. **ANONA** ; *foliis laurinis, glabris viridifuscis, fructu minore rotundo viridi-flavo, scabro, seminibus fuscis, splendentibus fissurâ albâ notatis.* Sloan. Cat. Pl. Jam. The Sappadilla or Nafeberry-tree ; *vulgô.*

7. **ANONA** ; *maxima, foliis laurinis, glabris viridi-fuscis, fructu minimo, rotundo, viridi-flavo, seminibus fuscis, splendentibus, fissurâ albâ notatis.* Sloan. Cat. Pl. Jam. The Bully-tree ; *vulgô.*

These Trees are the Produce of the warmest Parts of the *West-Indies*, as in *Jamaica*, *Barbados*, &c. where they are cultivated for their Fruits, which are in those Countries in very great Esteem, especially the *Sappadilla*, which they value more than any of the other Sorts, and hath been but lately introduced into some of those Islands. It is very probable that none of these Trees were originally Natives of these Countries, but have been transplanted from some other Parts of the World ; but being there planted, they thrive equally as well as if it were their native Soil, the *Sappadilla* only excepted, which is of a tenderer Nature than the others.

The Seeds of these Trees are frequently brought over from the *West-Indies* to *England*, but there are, at present, but few of the Plants

in being amongst us, they being of so nice a Nature, as not to endure our open Air in Summer ; nor will they live through the Winter, unless preserved in the warmest Stoves.

These Seeds should be sown in small Pots, filled with rich light Earth, early in the Spring, and the Pots must be plunged into a warm Bed of Tanners Bark, observing frequently to refresh the Earth in the Pots with Water, but give them little each Time, lest by too much Moisture the Earth should be chill'd, and the Seeds be thereby starved. If the Seeds were fresh, and the Bed in a kindly Temper for Heat, the Plants will come up in about three Weeks or a Month's Time, and will make a considerable Progress in a short Time after, therefore they should be transplanted, each Plant into a single Pot, being careful in doing it, not to shake the Earth clean from the Roots ; then plunge the Pots into the same Hot-bed, (provided the Bark hath not lost its Heat, which if it has, it should be stirred up with a Dung-fork, mixing therewith some fresh Tan) and give the Plants a little Water to settle the Earth to their Roots, observing to shade them from the Sun, during the Heat of the Day, until they have taken fresh Root ; after which you must constantly refresh them with Water, as you will see Occasion, and give them Air, by tilting up the Glasses, in Proportion to the Heat of the Weather, and the Bed in which they are plunged.

In about two Months after this, the Plants will have made a considerable Advance, and the Pots will be filled with their Roots ; you must therefore remove them into Pots of a little larger Size ; in doing of which you should take the Plant out of the small Pot, with all the Earth about its Root, then, with a Knife, gently trim off all the Roots which are on the Outside of the Ball of Earth, and after having put some fresh Earth into the Bottom of the new Pot, place the Plant exactly in the Middle, filling the Vacancies round the Root with the same fresh Earth ; then plunge these Pots again into the Hot-bed, giving them Water and Air as you shall judge necessary ; but observe in *August* to give them a great deal of fresh Air, whenever the Weather will permit, that they may be harden'd to go thro' the approaching Winter.

Towards the latter End of *September* you should be provided with a fresh Bark-bed in a Stove, (erected on purpose for these and other the like tender Plants) into which you must remove the Pots, when the Bark has lain about ten Days to settle and heat ; but if upon opening the Bark, to plunge in the Pots, you find the Heat very great, you should set the Pots but half way into the Bark at first, until the Heat is a little more abated, when you may sink them down to the Rims : During the Winter Season you must be very moderate in watering them, and also observe to keep the Stove in a due Temper of Heat : The Warmth in which they have best succeeded in Winter is, about ten Degrees above the Temperate Point, as mark'd on Mr. *Fowler's* Thermometers.

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In the Spring, viz. about the Middle of *March*, you should be provided with a fresh Parcel of Tan, which should be laid up in a Heap, in some dry Place, about ten Days before 'tis used: This Tan should be mixed with the old Tan, already in the Stove, which should be stirred up, and well mixed with the new. This will add a fresh Heat to the Bed, whereby the Plants will be put into Motion, and begin to grow; which must be shifted into bigger Pots as they advance, and in the Summer should have a good Quantity of Air, when the Weather is warm. With this Management I have several of these Plants in good Health, which are seven or eight Feet high; some of which have produced Flowers with me, but I have not had any Fruit form'd as yet.

ANONIS; Cammock petty Whin, or Rest-Harrow [*Ἀνώνη*, or *Ὀνώνη*, of *ἄν* an Ass, because Asses are said to rub themselves against this Plant.]

The Characters are;

It hath a papilionaceous Flower, which is succeeded by a swelling Pod, which is sometimes long, and at other times short, is bivalve, and fill'd with Kidney-shap'd Seeds.

The Species are;

1. **ANONIS**; *spinosa, flore purpureo*. C. B. Anonis or prickly Rest-Harrow, with purple Flowers.
2. **ANONIS**; *spinosa, flore albo*. C. B. Prickly Rest-Harrow, with white Flowers.
3. **ANONIS**; *spinis carens, purpurea*. C. B. Purple Rest-Harrow, without Prickles.
4. **ANONIS**; *spinis carens, candidis floribus*. C. B. Rest-Harrow, without Prickles and white Flowers.
5. **ANONIS**; *Spicata, fide Alopecuroides, Lusitanica*. Hofm. Cat. Portugal Rest-Harrow, with Spikes of Purple Flowers.
6. **ANONIS**; *purpurea, verna, seu præcox, perennis, frutescens flore rubro amplo*. Mor. Hist. Early shrubby Purple Rest-Harrow, with ample Red Flowers.
7. **ANONIS**; *lutea, angustifolia, perennis*. Boerb. Ind. Yellow Narrow-leav'd perennial Rest-Harrow.
8. **ANONIS**; *siliquis ornithopodii*. Boerb. Ind. Rest-Harrow, with Pods like the Bird's-Foot.
9. **ANONIS**; *Americana, folio latiori subrotundo*. Tourn. American Anonis, with broad roundish Leaves.

The four first Sorts grow wild in divers Parts of *England*, and are seldom propagated in Gardens: The first Sort is used in Medicine; the Roots of this Plant spread very far under the Surface of the Ground, and are so tough, that in ploughing the Land it often stops the Oxen; from whence it had its Name, viz. *Resta Bovis*. The second Sort is but a Variety of the first, differing only in the Colour of the Flower. The two others, without Spines, are often met with near the first.

The 5th, 6th, and 7th Sorts, are beautiful Garden Plants; these are propagated by sow-

ing their Seeds in the Spring of the Year, in an open situated Bed of light Earth; and when the Plants are come up, they should be transplanted carefully, either into Pots (filled with good fresh Earth) or into warm-situated Borders, for they are subject to be destroyed by hard Frosts; therefore it is, that I would advise the preserving some Plants of each Kind in Pots, which may be sheltered in the Winter under a common hot Bed Frame, and the Spring following may be turned out of the Pots (preserving all the Earth to their Roots) and planted in a warm Border, where they may remain to flower; and if the Season is good, they will perfect their Seeds in *August*, or sooner.

The 8th and ninth Sorts are Annuals, and must therefore be sown every Spring: The 8th will do very well, if sown on a Bed of fresh Earth in the open Air, where it may remain to flower and seed; but the 9th should be sown on a moderate Hot-bed, and managed as is directed for the *Balsamina*; this will produce its Flowers in *July*, and the Seeds will ripen in *September*.

ANTHERÆ, [of *ἄνθος* a Flower, and *ῥίζα* of a Rose, Gr.] are the Summits or little Tops in the middle of the Flower, supported by the *Stamina*. The *Chives*.

ANTHOLOGY, [of *ἄνθος* and *λόγος*, Gr. a Word] a Discourse or Treatise of Flowers.

ANTIRRHINUM; [*Ἀντίρρινον* of *ἀντί* against, and *ῥίς* the Nostrils, as tho' it represented a Nose: It is also call'd *Cynocephalus*, of *κύων* a Dog, and *κεφαλή* a Head, because its Fruit resembles the Head of a Dog.] Snap-dragon or Calves-snout.

The Characters are;

It is a Plant with an anomalous Flower, consisting of one Leaf, which is divided, as it were, into two Lips; the upper of which is cut into two Parts, and the under into three Parts: Out of the Flower-cup arises the Pointal, fasten'd like a Nail in the hinder Part of the Flower, which afterwards turns to a Fruit resembling a Calf's-head, which is divided in the Middle by a Partition into two Cells, in which are contain'd many small Seeds.

There are several Varieties of this Plant, which are worthy of a Place in large Gardens, for the Oddness of their Flowers, which continue blowing most Part of the Summer, and are very useful to compose Flower-pots to adorn Chimnies or Halls: The chief Sorts are,

1. **ANTIRRHINUM**, *latifolium, flore rubro vinctu luteo*. Boerb. The Broad-leav'd Snap-dragon, with red Flowers.
2. **ANTIRRHINUM**, *latifolium, flore albo vinctu luteo*. Boerb. The Broad-leav'd Snap-dragon, with white Flowers.
3. **ANTIRRHINUM**, *angustifolium, majus peregrinum, flore ruberrimo*. H. R. Par. The large Narrow-leav'd Snap-dragon, with deep red Flowers.

4. **ANTIR-**

4. *ANTIRRHINUM, angusto folio linariae eleganter variegato, flore rubro rictu luteo.* Boerb. The Strip'd Snap-dragon.

All these Sorts are raised from Seeds, which should be sown in a dry Soil, and not too rich, in April or May; and in July may be planted out into large Borders, where they will flower the Spring following; or they may be sown early in the Spring, for flowering the same Autumn, but then they are not so likely to endure the Winter; and if the Autumn prove bad, they will not perfect their Seeds.

These Plants grow extremely well upon old Walls or Buildings, in which Places they will endure for several Years; whereas those planted in Gardens seldom last longer than two Years, unless they are planted in a very poor Soil, and the Flowers often cropp'd, and not suffer'd to seed: But any of these Sorts may be continu'd, by planting Cuttings in any of the Summer Months, which will easily take Root. The fourth Sort is tenderer than any of the former, and should therefore be planted in Pots fill'd with rubbishing dry sandy Soil, and shelter'd in Winter under a common Hot-bed Frame, observing to give them free open Air, by taking off the Glasses in mild Weather, and only covering them in very wet, or frosty Weather.

APARINE; [This Plant is so called, because 'tis very rough: It is called *Phitodelphos* and *Phitantropon* of *οὐκὶς* I love, and *ἀνδραῖος* a Man, because if a Person walks in uncultivated Places, the Plant not only applies itself to his Garments, but it holds them, as if it had a mind to bind a Man with an amiable Band: It is also called *Omphalocarpon*, of *ὀμφαλός* a Navel, and *καρπός* Fruit, because the Seeds resemble a Navel] Goose-grass or Clivers.

This Plant grows wild almost every where, the Seeds sticking to the Cloaths of People that pass by where they grow: It is sometimes used in Medicine, but is too common a Weed to be admitted into a Garden.

APETALOUS Plants [of *α* Priv. and *πέταλον* a Flower-leaf, G.] are such as have no Leaves or Flower-leaves.

APICES, [of *Apex*, Lat. a Top or Point] those little Knobs that grow on the *Stamina* in the middle of the Flower: They are commonly of a dark purplish Colour; they have been discovered by the Help of Microscopes, to be, as it were, a sort of Seed-vessels, containing in them small globular or oval Particles of various Colours, and exquisitely form'd; they are by some suppos'd to be a kind of Male Sperm, which falling down into the Flower, fecundates and ripens the Seed.

APIOS, [is so called of *ἄπιος* a Pear, because its Root resembles a Pear.] The knobbed rooted *Virgiman* Liquorice Vetch.

The Characters are;

It has a climbing Stalk; the Leaves grow

almost opposite, and fastened, as it were, to the Mid-rib; the Root is tuberous.

There is, at present, but one *Specie* of this Plant known to us; which is,

APIOS, Americana. Cornuti. The American *Apios* of *Cornutus*.

This Plant hath large knobbed Roots, which part as they grow old, by which means the Plant is increased, for it rarely produces ripe Seeds with us: It is hardy, and will endure the Cold in the open Ground, if planted in a dry Soil, but is subject to rot with too much Wet in Winter: It dies to the Root every Autumn, and rises again the succeeding Spring, and will twist itself round a Pole, and grow to the Height of eight or ten Feet, and produce in July fine Spikes of Flowers: It hath also been planted near Arbours, where it hath covered them very well toward the latter End of Summer, but is cut down with the first Cold of Autumn.

APIUM, [*Apium* is so called, as some say, of *Apes*, Bees, because Bees are said to be delighted very much with it; or of *Apex*, because the Antients made Crowns of it to adorn the Head: It is called *Eleoselinum* of *ἐλεος* a Marsh, and *σέλινον*, and *Paludapium* of *Palus* and *Apium*.] Parsley.

The Characters are;

The Leaves are divided into Wings, or grow upon a branched Rib, and are, for the most part, cut into small Segments: The Petals of the Flower are whole, and equal; each Flower being succeeded by two gibbous channell'd Seeds.

This is an Herb so well known, that it is not worth while to say much about it, every old Woman in the Country, that hath a Garden, knows how to cultivate a Parsley-bed; however, I shall mention two or three Sorts which are not so well known as the common Sorts are with us, viz.

1. **APIUM, vel Petroselinum, crispum.** C. B. P. The Curled Parsley.

2. **APIUM, bortense, latifolium, maximâ, odoratissimâ suavi, & eduli radice.** Boerb. The large Garden Parsley, with thick sweet eatable Roots.

3. **APIUM, Macedonicum.** C. B. Macedonian Parsley.

4. **APIUM, Anisum dictum semine suaveolenti majore.** Tourn. Parsley, with large sweet-scented Seeds, commonly called *Anise*.

The Curled Parsley is sown in some curious Gardens, for garnishing Dishes; the Leaves being curiously furbelowed, answer this Purpose very well, and the Herb is equally as good for Use as the Common, it being only a Variety thereof. In order to have this large and fine, it should be sown very thin, or when it first comes up, transplant it out at the Distance of four Inches square; by which Management your Leaves will be extremely large and fair, and, if you do not suffer it to seed, will endure three Years very well; but if it seeds, it will seldom continue good after.

The

The great Garden Parsley is, at present, little known to us in England, but in Holland it is very common in all their Markets: They bring these Roots in Bunches, as we do young Carrots, to Market, in Summer; and the Roots are much of the same Size: It is call'd *Petrofeline Wortle* by the Dutch, who are very fond of it.

It may be cultivated by sowing the Seeds in good Ground early in the Spring, and in April, when the Plants are up, cut them out with a Hoe, (as is practis'd for young Carrots) to about four or five Inches square, and keep them constantly clean from Weeds, and in July the Roots will be fit to draw for Use, and may be boil'd and eaten as young Carrots, and are very palatable and wholesome, especially for those who are troubled with the Gravel.

The Macedonian Parsley is a Stranger in our Country, and not to be found except in curious Botanick Gardens: This Plant is propagated by sowing the Seed, in the Spring of the Year, in an open well-expos'd Bed of fresh Earth; and in the Summer, when the Plants are come up, they should be transplanted, some of them into Pots, fill'd with fresh light Earth, and others into a well-shelter'd dry Border, where they may remain until they flower, which is not before the second, and sometimes the third Year; but those that were planted in Pots, should be shelter'd, during the Winter-season, under a Hot-bed Frame, giving them free open Air whenever the Weather is mild. These Plants, in the Spring following, may be turn'd out of the Pots into the full Ground, that their Seeds may be the better maturated.

The Anise is a very difficult Plant to make grow with us; for although we have fresh Seeds from Abroad, which will often come up very well, yet if there happens but a little wet or cold Weather in the Summer-time, the Plants will rot off and die away. The best Method, I believe, is to raise the Plants upon a moderate Hot-bed early in the Spring; and when they are come up, prick them out again upon another Bed that hath a little Warmth, observing to expose them to the open Air by degrees, by which means they will have more Strength, and consequently be in less Danger of being hurt by bad Weather: But this Plant is not worth propagating for Use in England, since we can have the Seeds much better, and at a cheaper Rate from Italy than they can be produc'd here.

APOCYNUM; [*Ἀποκύνος* of *ἀπό* and *κύνος*, of a Dog, because the Antients believed this Plant would kill Dogs. The Egyptians call this Plant *Offar*, whence comes the Name of the Fruit *Bidessar*, as though *Bordes Offar*, which in the Arabick Tongue signifies the Egg *Offar*.] Dogsbane.

The Characters are;

The Leaves are produced opposite, by Pairs upon the Branches; the Flower consists of one Leaf, which is cut into several Segments; from

its Flower Cup arises the Pointal, which is fix'd like a Nail in the back part of the Flower, and is afterwards chang'd into a Fruit, which is for the most part compos'd of two Capsules, or Pods, which open from the Base to the Top, inclosing many Seeds, which have a long pappous down adhering to them: To this may be added, that the whole Plant abounds with a milky Juice.

There are several Sorts of this Plant cultivated in the curious Gardens of Plants, some of which are very beautiful, and deserve a Place in every good Garden: I shall mention the different Species of this Plant, which are cultivated in the English Gardens, and shall leave the Reader to select such of them as he shall fancy to cultivate.

1. **APOCYNUM**; *erectum, latifolium, incanum, Syriacum, floribus parvis obsolete purpurascens*. Par. Bat. The upright broad-leav'd hoary Syrian Dogsbane, with purplish colour'd Flowers.

2. **APOCYNUM**; *erectum, Canadense angustifolium*. Par. Bat. The upright narrow-leav'd Canada Dogsbane.

3. **APOCYNUM**; *erectum, Canadense latifolium*. Par. Bat. The broad-leav'd upright Canada Dogsbane.

4. **APOCYNUM**; *Americanum, foliis Androsæmi majoris, flore Liliæ Convallium suave-rubentis*. H. K. P. The American Dogsbane, with Tussock Leaves, and red Flowers, like the Lily of the Valley.

5. **APOCYNUM**; *erectum, struticosum, folio subrotundo viridante*. Par. Bat. The shrubby upright Dogsbane, with roundish green Leaves.

6. **APOCYNUM**; *erectum, Africanum, folio salicis angusto glabro, fructu villosa*. Par. Bat. The upright willow-leav'd African Dogsbane, with hairy Fruit.

7. **APOCYNUM**; *Afrum, scandens, folio rotundo, subincano nummulariæ*. Boerb. The African creeping Dogsbane, with Leaves like Moneywort.

8. **APOCYNUM**; *erectum folio oblongo, flore umbellato petalis coccineis reflexis*. Sloan. Cat. The upright Dogsbane, with oblong Leaves, and Scarlet Flowers, call'd by some *Bastard Ipecacuana*.

9. **APOCYNUM**; *Canadense, angustifolium flore Aurantiæ*. Mor. Præf. The narrow-leav'd Canada *Apocynum*, with Orange-colour'd Flowers.

10. **APOCYNUM**; *Marylandicum, erectum, folio subrotundo, flore ruberrimo*. The upright Maryland Dogsbane, with roundish Leaves, and deep red Flowers.

The first of these Dogsbanes is a prodigious Creeper at the Root, and will in a short time overspread a large Compass of Ground, and must never be planted too near other Plants or Flowers, which would be over-run by this Plant, and destroy'd; but it may have a Place in some obscure Part of the Garden, for it is extremely hardy, and will thrive in almost any Soil or Situation: It grows to be six or seven Feet high, and produces large Umbels of Flowers, which have a strong sweet Smell, but are of a poisonous Nature, as

are all the true *Apocynums*, and therefore should not be planted in the way of Children, who may receive Damage by breaking any part of the Plant, and letting the milky Juice, with which they abound, run upon the tender Part of their Flesh, which will be apt to blister it; these Flowers are sometimes succeeded by large oblong Pods, which contain a great Quantity of a soft cottony Substance, that adheres to the Seeds, and are of Service to transport them to a Distance when ripe. This Plant dies to the Root in Winter, and rises again the succeeding Spring.

The second, third, fourth, and tenth Sorts, are all of them very hardy, and may be planted in the open Ground, but must have a dry Soil; these all of them produce large fine Flowers, and are propagated by parting their Roots in March after the cold Weather is past, for they seldom produce ripe Seeds with us.

The fifth, sixth, seventh, and eighth Sorts, are tender, and must be preserv'd in Pots, and hous'd in Winter.

The fifth and sixth Sorts will grow very Shrubby, and sometimes to the Height of eight or nine Feet, and do produce Bunches of Flowers, which in the sixth Sort are of a whitish Green, and the fifth of a worn-out purple Colour, but are of no great Beauty or Smell. These are increas'd by planting Cuttings in any of the Summer Months, in Pots of light sandy Earth, plunging them into a moderate Hot-bed, and shading them from the great Heat of the Sun, giving them gentle Retrefhings of Water. These must have a good Greenhouse in Winter, and must not have too much Water in that Season.

The seventh Sort is a climbing Plant, and will twist itself round a Stake, and grow to the Height of seven or eight Feet, and in Summer will produce from the Joints small Umbels of worn-out purple-colour'd Flowers, which are extremely sweet: This is propagated by laying down the young Shoots, which do easily take Root, or by parting the Roots of the old Plants.

The eighth Sort is the most tender of them all, and requires a moderate Stove to preserve it in Winter; this produces extreme beautiful scarlet Flowers, which often are succeeded by ripe Seeds: This Plant may be increas'd by planting the Cuttings in June, in a moderate Hot-bed, but must have little Water, and be secured from the violent Heat of the Sun, and the Cold of the Nights; but the best way to propagate them, is by sowing the Seeds in a Hot-bed in March; and when the Plants are come up, prick them into small Pots, and plunge them into another Hot-bed to bring them forward; and in June you may begin to expose them to the open Air, at which time they will begin to flower; but it will be advisable to preserve one or two of the strongest in the Hot-bed, in order to procure good Seeds.

The ninth Sort is tolerably hardy, and only requires to be screen'd from the extreme Cold in Winter; and I believe, if it were planted into the full Ground, under a warm Wall, it would do very well, but as I have not yet

tried it, so I can't affirm it will do: This Plant produces beautiful Umbels of Orange-colour'd Flowers, which abide most part of the Month of August, and deserve a Place in the most curious Garden. This is propagated by parting the Roots in March, or sowing the Seeds, which in a good Season do ripen tolerably well with us.

APPLE Tree, by the *Latins* call'd *Malus*.

The Characters are;

The Fruit of this Tree is for the most part hollowed about the Foot-stalk, the Cells in which the Seeds are lodg'd, are separated by cartilaginous Partitions, the Juice of the Fruit is sowerish; and the Tree is large and spreading: To this may be added, the Flowers consist of five Leaves, which expand in Form of a Rose.

There are a great Variety of these Fruits propagated in England, either for the Kitchen, the Desert, or to make Cyder: I shall mention the most curious Sorts for each Purpose, omitting the ordinary Kinds, as not worth naming, and shall then proceed to their Culture and Management.

A List of such Apples as are proper for a Desert, plac'd according to their Times of Ripening.

White Juniting
Margaret Apple
Summer Pearmain
Summer Queening
Embroider'd Apple
Golden Reinette
La Calville d'Esté blanche; or, Summer white Calville.
La Calville d'Esté rouge; or Summer red Calville
Silver Pippin.
Aromatick Pippin.
La Reinette grise
La Haute-bonté
Royal Russetting
Wheeler's Russett
Sharp's Russett
Le Fonouillet, or Pome d'anis; or Spice Apple
Golden Pippin
Nonpareil
L'Api; or, Homme d'Api

A List of such Apples as are preferr'd for Kitchen Use, plac'd nearly according to their Times of Ripening.

Codling
Summer Marygold
Summer red Pearmain
Holland Pippin
Kentish Pippin
Le Courpendu ou Pomme de Bardin; or, The Hanging Body
Loan's Pearmain
French Reinette
French Pippin

Royal

- *Royal Russett*
- Monstrous Reinette*
- Winter Pearmain*
- Pomme Violette*
- Spencer's Pippin*
- Stone Pippin.*
- Oaken Pin*

A List of such Cyder Fruits as are in most Esteem for that Purpose.

Devonshire Royal Wilding
Red Streak'd Apple
The Whitfour
Herefordshire Underleaf
John Apple; or Deux-Anne's.

The several Sorts of Apples are planted, either as Standards, in Orchards or Gardens, or Dwarfs, or in Espaliers, and sometimes against Walls: Those that are design'd for Standards, should be grafted on Crab-stocks, which are much hardier, and of longer Duration than any other Sort of Apple; but those that are design'd for Dwarfs, or Espaliers, may be grafted, either on the Paradise-stock, Codling, or any other Sort of Apple-stock that doth not shoot too freely. The Manner of Grafting will be describ'd under its proper Article; and the Manner of raising and managing the Stocks, will be explain'd in the Article of Nurseries, to which I refer the Reader, and proceed to the Manner of planting them out for good.

If you intend to make a new Orchard, the Soil should be plough'd; if a Green-sward, at least twice before planting, that the Earth may be mellow'd, and imbibe the nitrous Particles of the Air, and that the Turf may be well rotted and mix'd with the Earth; but if it hath been plough'd Ground, one good Ploughing will be sufficient.

The best Season for planting these Trees, if the Soil is dry, is in *October*, as soon as the Leaves begin to decay; but in a wet Soil, it is best to defer it till *February*.

The Distance these Trees ought to be planted, is at least forty feet square, that the Sun and Air may freely pass to every Part of the Tree, to dissipate all crude and unhealthy Vapours, which are either exhal'd from the Earth, or produc'd from the Perspiration of the Trees, and are many times the Cause of Blights, or are, at least, absorb'd again by the Trees, when in a State of Respiration, and must occasion the Fruit to be crude and ill-tasted, which is too often attributed to the Soil, when the only Cause of it may be their being too closely planted. This Distance, many People will, perhaps, think too much, but I dare say, it would be still better, could they be allow'd eighty Feet Distance Row from Row, and forty Feet in the Rows; nor would I advise the Planting of Cherries, or any other Sort of Fruit-trees between them, till they are arriv'd to an Age of Maturity; but rather, that the Ground between them should be plough'd and till'd with Corn, or any other Crop, as if it were intirely open; and it hath been experienc'd by several People in *Hereford-*

shire, and other Counties in *England*, that their Crops have been exceeding good, and their Trees much improv'd by the turning of the Soil, for want of which Culture, together with their close standing, we find vast Numbers of Orchards that have scarcely a healthy Tree in them, the greatest Part of them being either canker'd, or cover'd over with Moss; and how can we suppose to eat kindly Fruit from distemper'd Trees; We may with as much Justice, affirm, that a distemper'd Woman will give healthy Milk, which I believe no one will dare to, tho' there is equally the same Probability in both.

And since I am upon this Article of close Planting, suffer me to make a little Digression, not altogether foreign to our present Purpose; which is to take Notice of a prevailing Error, in planting of Fruit-Gardens, like Wilderness-Trees or Flowering-Shrubs, close together, and mixing the different Sorts of Fruits in each Division, in such a manner, that no two Trees of the same kind shall stand near each other, supposing each Tree to draw different Particks from the Ground for their Nourishment, and suffering them to grow, as they are naturally dispos'd, without ever pruning them, hereby hoping to have great Quantities of Fruit, with very little Trouble after the first planting.

Now granting this last Supposition to be true, (though I am fully convinc'd of the contrary) yet how absurd is it to think, that what little Fruit may be produc'd in this Way, can be equally so good or wholesome, as those which are the Product of healthy Trees, and have the Advantages of a free Air, and the Benefit of the kindly Sun, to correct and dissipate the Crudities of the Earth round the Roots, as also those moist Vapours which are almost continually perspiring from the Trunks, Branches, and Leaves of these Trees, which for want of the Air's free Admittance, are constantly hovering about the Trees in these Plantations; and in cold Weather, or the Night-time, when the Trees are in a State of Respiration, these rancid Vapours are imbib'd through the Pores of the Leaves, and mix'd with the Juices, and are protruded through the Vessels, and enter the Fruits, whereby they must be render'd ill-tasted and unwholesome.

But as this Practice was introduc'd by some Persons who were intirely ignorant of what they undertook, and set out upon wrong Principles of Philosophy, so, I hope, the Gentlemen to whom this Method may be propos'd, will be so kind to themselves, as to wait a little and see the Effect of those Plantations already made, before they set on Foot so wild a Project.

Indeed, I am aware how many Enemies I shall raise by retrenching the great Demand for Fruit-trees, which must of Necessity be made in the several Nurseries in *England*, if this Practice be continu'd; but as I shall, through the whole Book, deliver my Sentiments freely, on every Article here treated of, aiming at nothing more than the Information of my Readers, so I hope there will be found

found none of my Profession of such mercenary Tempers, as to condemn me for telling Truth, tho' it may not always exactly agree with their present Interests; but enough of this at present, let us now return to our Planting.

When the Season for Planting is come, as was before directed, we must make Choice of good thriving Trees, of about three Years grafting, but by no means chuse old Trees, as is the Practice of some, thinking thereby to save Time; whereas a young thriving Tree, will in three or four Years after Planting, overtake one of these old ones, and make far better Trees in a few Years than they ever will do: Nor should you take Trees from a rich Soil, to plant into a poor one; or from a wet Soil, for a dry one, but endeavour, if possible, to have your Trees from a Soil as near in Quality to your own as possible, or rather from one that is not quite so good as yours.

In preparing these Trees for planting, cut off all broken or bruised Roots, or such as cross and gall each other; as also all small Fibres, which rarely survive a Remove, (unless the Trees are planted immediately after taking up, before the Wind has dry'd them) and are very subject to mould and rot, and are often prejudicial to the new Roots, by obstructing their Progress, and many times destroy them soon after they are produc'd, by the spreading of the Mouldiness which they had taken quite round the older Roots: You must also at the same time, take off some of the most luxuriant Branches, and shorten others, so as to reduce the Head to a handsome Figure, and moderate Size, but by no means cut and lop the Head in such an unmerciful manner as some do, for a moderate Proportion of Head is absolutely necessary to furnish Nourishment to the Roots, until new ones are produc'd to supply the Heads, and the making large Wounds at both Parts of the Tree at the same time, must be very hurtful. Your Trees being thus prepar'd, make a Hole with a Spade where each Tree is to stand, about two Feet deep, more or less, according to the Size of their Roots; and so likewise in Width, according to the same Proportion, making it level in the Bottom, and breaking all hard Clods; then place the Tree in the Center of the Hole, as upright as possible; and while one Person keeps the Tree in its right Position, another should, with a Spade, break the Earth, and lay it in between the Roots, shaking the Tree, the better to let the Earth fall between every Root, that there may be no Cavity left: Then with your Feet, gently press the Earth down to fasten and settle the Tree; and if the Weather prove dry, it will not be amiss to give each Tree a good Watering, which will fix the Earth to them, and greatly forward their Production of new Roots: You should also, if the Heads of the Trees are large, fix a Stake to each Tree, to prevent their being shaken with the Winds, which would disturb and greatly injure the new Roots: And if the Season after planting should prove very dry, you must repeat your Waterings, but do not over-water them, which is a Fault many People

are guilty of; for too much Wet rots all the new Roots, which are very tender for the first and second Years, and very subject to Damages during that Time; but if you can conveniently procure a Quantity of Green-sward, par'd from a Common, &c. and lay a little of it round the Foot of each Tree, so as to cover the Surface about three Feet round the Stem, with the Grass downwards; this will preserve the Ground from drying too fast, and render one Watering of more Service than three or four would otherwise be. The next Winter, after planting, this Turf will be rotted, you should therefore, early in *February*, when the great Frosts are over, gently dig up the Ground about each Tree, burying this rotten Turf in the Bottom, which will keep the Ground loose, and greatly promote the Growth of the Trees. An Orchard or Garden thus planted, and manag'd, will afford the Owner no small Pleasure, by the Advance the Trees will make, and must as greatly redound to his Profit.

I shall now proceed to give Directions for planting *Dwarfs*, either for Standards or *Espaliers*; tho' I must own, Dwarf Standard-trees are what I should never advise any Person to plant, for their Heads do, in time, grow so large, that there is no getting near their Stems, so that the Ground between them is wholly useless for any Purpose; nor can the Sun reach to warm the Ground and dissipate crude Vapours, so that the Fruit can never be so well-tasted as those produc'd from *Espaliers*, which enjoy all the Advantages of Sun and free Air; but if you are determin'd to have Dwarf-trees, you must allow them a large Distance from each other; twenty-four Feet square is the least they should be planted; and when the Trees begin to make Shoots, they must be fasten'd down to Stakes, drove into the Ground all round the Tree, as horizontally as possible, for if you suffer the Branches at first to grow upright, you can never after reduce them to a proper Figure, without either quite cutting down the Branches, or plashing and mangling them so much as often to canker and decay the Tree. In pruning these Trees, great Care should be taken to keep their middle Part as free from Wood as possible, and not suffer their Branches to cross each other: The farther Particulars I shall refer to the pruning of *Espaliers*, which will also agree for *Dwarfs*, excepting what I have already mention'd.

Espaliers are commonly planted to surround the Quarters of a Kitchen-Garden, in which Place they have a very good Effect, if rightly planted and manag'd, rendering it not in the least inferior to the finest *Parterre*, or most finish'd Pleasure Garden: For what can be more agreeable than to walk between regular Hedges of Fruit-trees, which early in the Spring are cover'd with beautiful Flowers, and in Summer and Autumn, are charg'd with noble Fruits of different Kinds; and the Kitchen Stuff in the Quarters are entirely hid from Sight, and also screen'd from the Injuries of Weather?

In

In the Distribution of the Quarters, I would advise that they are not too small, which renders them unfit for many sorts of Kitchen Stuff, and also occasions your Espaliers to be too near each other, which should always be avoided: The Extent of these Quarters ought to be in proportion to the Bigness of the Garden; in a large Ground they may be two hundred and fifty Feet square, or three hundred Feet long, and one hundred Feet broad, according to the Figure of the Garden; and in small Gardens one hundred feet square is as much as can be allowed, and the Walks between the Espaliers should also be in breadth according to the same Proportion. When your Ground is prepar'd for Planting, you should endeavour to make Choice of Trees which shoot nearly alike, to plant in each Espalier, by which means you may the better proportion their Distances, in order to have the Espaliers of an equal Height, and not to intermix weak-shooting Trees amongst the most luxuriant, which would occasion a very unightly Hedge.

The Distance these Trees should be planted, if on Crab or Free Stocks, should be, for large shooting Trees, twenty Feet, and for the weaker, sixteen; but if they are on Paradise Stocks, ten or twelve Feet will be sufficient: The manner of preparing and planting these Trees being the same with those before-mention'd, I shall not repeat it, but refer the Reader thereto; but only shall observe here, that it will be proper to head these Trees to about four Eyes above the Graft, and never to chuse Trees more than two years old from the Time of Grafting, for older Trees are not so subject to break out when headed, their Bark being for the most part hard, and the Wounds given to old Trees are not so soon healed as in young ones.

The Summer following, you must provide a Parcel of small Stakes, of about three Feet long, to drive into the Ground on each Side of your Trees; four to each Tree will be sufficient; to these Stakes you must fasten the new Shoots, as they are produced, as horizontally as possible, and not suffer them to grow upright, as is the too common Practice of many; for the Branches being thus train'd in Summer, will want no Force or Violence to be used in Winter, to bring them to their proper Places, nor will their Shoots be so gross and stubborn.

If the Trees have taken kindly, it is very probable that all the four Eyes have produced Shoots; if so, at *Michaelmas* (which I would fix for the Time of Pruning) cut the two uppermost Shoots to four Eyes each, in order to furnish your Tree with Branches, but the two undermost may be left six or eight Joints in Length, in proportion to their Strength; but let me lay it down for a Rule, never to shorten any Shoots in Summer, unless it be to furnish Branches to fill up a Vacancy in the Espalier, and this should never be done after *May*; for Shoots which are produced after *Midsummer*, are never duly ripened and prepared, so can never be proper, either for the Production of Wood or Fruit.

But if your Trees have made but three Shoots the first Summer, then at *Michaelmas* shorten the uppermost to three Eyes, leaving it upright in the Middle of the Tree, and shorten the two Side-Branches to five or six Eyes, in proportion to their Strength, training them as horizontally as possible; and if they should have produced but two Shoots the first Year, then it would be advisable to shorten both of these to four Eyes each, for Reasons before given.

The second Year you must observe to train in all new Shoots horizontally, as in the first, and to displace all fore-right Shoots, which will not come handsomely into the Espalier, as fast as they are produced, that they may not exhaust the Nourishment of the Tree: At *Michaelmas* shorten the Shoots in the middle Parts of the Tree, or where Branches are wanted to fill up Vacancies; but for ever after be cautious of unmerciful lopping or shortning of Branches, for the more you cut, the more they shoot, and there is no Way so sure in the Management of all Fruits, as to leave their Branches at full length, where the Tree is fully supply'd with Wood, training them as horizontally as may be, which will prevent their luxuriant shooting; besides, in many Sorts of Fruits, the Blossom-buds are first produced at the Extremity of the last Year's Shoots, so that if they are cut off, you destroy the greatest Part of your Crop.

These few Rules, with diligent Observation, will be sufficient for the well-regulating and managing your Espaliers, so as to reap both Profit and Pleasure.

APPLES OF LOVE; *vide* Lycopersicon & Solanum.

MAD APPLES; *vide* Melongena.

APRICOCK or ABRICOT; or, in *Latin*, *Malus Armeniaca*.

We have in the *English* Gardens about eight Sorts of this Fruit cultivated; which are,

1. The *Masculine Apricock*.
2. The *Orange Apricock*.
3. The *Algier Apricock*.
4. The *Roman Apricock*.
5. The *Turkey Apricock*.
6. The *Transparent Apricock*.
7. The *Breda Apricock*.
8. The *Bruxelles Apricock*.

These Fruits are all propagated by budding them on Plumb-stocks, and will readily take upon almost any sort of Plumb, provided the Stock be free and thriving (except the *Bruxelles* kind, which is usually budded on a sort of Stock commonly call'd the *St. Julian*, which better suits this Tree, as being generally planted for Standards, than any other sort of Plumb will do): The manner of raising the Stocks, and budding these Trees, shall be treated of under their particular Articles, to which I refer the Reader, and shall proceed to their Planting and Management.

These Trees are all (except the two last sorts) planted against Walls, and should have

an *East* or *West* Aspect, for if they are planted full *South*, the great Heat causes them to be mealy before they are well eatable.

The Borders under these Walls should be four Feet wide, at least, and if it were more, the better; but I would never advise the making of them so deep as is the general Custom, for if the Earth be two Feet thick it is enough.

If your Ground is a wet, cold Loam or Clay, you should raise your Borders as much above the Level of the Surface as it will admit, laying some Stones or Rubbish in the Bottom, to prevent the Roots from running downward; but if you plant upon a Chalk or Gravel, you must remove it to a considerable Width, to make Room for a good Soil to be put in; but you need not go above two Feet deep at most.

The Soil, I would in general advise to be used for these and all other sorts of Fruit-Trees, is fresh untry'd Earth from a Pasture Ground, taken about ten Inches deep, with the Turf, and laid to rot and mellow at least twelve Months before it is used; and this must be kept often turn'd to sweeten and imbibe the nitrous Particles of the Air.

Your Borders being thus prepared, make Choice of such Trees as are but of one Year's Growth from budding, and, if your Soil is dry, or of a middling Temper, you should prefer *October* as the best Season for Planting, especially having at that Time a greater Choice of Trees from the Nurseries, before they have been pick'd and drawn over by other People. The manner of preparing these Trees for Planting, being the same in common with other Fruit-Trees, I shall refer the Reader to the Article of *Apple-Trees*, where he'll find it largely treated of: But do not cut off any Part of the Head at that Time, unless there are any strong fore-right Shoots, which will not come to the Wall, and may be taken quite away.

Your Trees being thus prepared, you must mark out the Distances they are to stand, which in a good strong Soil, or against a low Wall, should be eighteen Feet or more; but in a moderate one sixteen Feet is a good reasonable Distance; then make a Hole where each Tree is to stand, and place its Stem about four Inches from the Wall, inclining the Head thereto; and after having fix'd the Tree in the Ground, nail the Branches to the Wall, to prevent their shaking, and cover the Surface of the Ground round the Root with rotten Dung to keep out the Frost; in this State let it remain till *February*, when, if the Weather is good, you must un-nail the Branches of your Trees, so as not to disturb their Roots, and being provided with a sharp Knife, put your Foot close to the Stem of the Tree; and having plac'd your Left-hand to the Bottom of the Tree, to prevent its being disturb'd, with your Right-hand cut off the Head of the Tree, to about four or five Eyes above the Bud, so that the sloping Side may be toward the Wall.

In the Spring, if the Weather proves dry, you must now and then give your Trees a gentle Refreshing with Water; in the doing of

which, if you observe to water them, with a Rose to the Watering Pot, all over their Heads, it will greatly help them, and also lay some Turf, in the Manner directed for Apples, or some other Mulsh, round the Roots, to prevent their drying during the Summer Season: As new Branches are produc'd, observe to nail them to the Wall in an horizontal Position; and such Shoots as are produc'd fore-right, must be intirely displac'd. This must be repeated as often as is necessary to prevent their hanging from the Wall, but by no means stop any of the Shoots in Summer.

At *Michaelmas*, when the Trees have done growing, you must un-nail their Branches, and shorten them in proportion to their Strength; a vigorous Branch may be left eight or nine Inches long, but a weak one should not be left above five or six. I suppose many People will wonder at this Direction, especially having allow'd such a Distance between the Trees, as believing by this Management the Wall will never be fill'd; but my Reason for it is, that I would have no Part of the Wall left unfurnish'd with bearing Wood, which must consequently be the Case if the Branches are left to a great Length at first; for it seldom happens, that more Buds than two or three shoot for Branches, and these are for the most part such as are at the extreme Part of the last Year's Wood; so that all the lower Part of the Shoots become naked, nor will they ever after produce Shoots; and this is the Reason we see so many Trees which have their bearing Wood situated only in the extreme Part of the Tree.

When you have shorten'd the Shoots, be sure to nail them as horizontally as possible; for upon this it is, that the future Good of the Tree chiefly depends.

The second Summer observe, as in the first, to displace all fore-right Shoots, as they are produc'd, nailing in the other close to the Wall horizontally, so that the Middle of the Tree may be kept open; and never shorten any of the Shoots in Summer, unless to furnish Branches to fill vacant Places on the Wall, and never do this later than *April*, for Reasons before given in the Article of *Apples*. At *Michaelmas* shorten these Shoots, as was directed for the first Year, the strong ones may be left nine or ten Inches, and the weak ones six or seven at most.

The following Year's Management will be nearly the same with these; but only observe, that *Apricocks* produce their Blossom Buds, not only upon the last Year's Wood, but also upon Curfons or Spurs, which are produc'd from the two Year's Wood; great Care should therefore be had in the Summer Management, not to hurt or displace these: Observe also, to shorten your Branches, at the Winter pruning, so as to furnish fresh Wood in every Part of the Tree, and be sure to cut out intirely all luxuriant Branches, or displace them as soon as they are produced, which would exhaust the Nourishment from the bearing Branches, which, in my Opinion, can't be too strong, provided they are kindly; for the more vigorous your Tree is, the more likely it is to resist

resist the Injuries of the Weather: And I have often seen Trees brought to so weak a Condition, as to be able only faintly to blow their Blossoms, and then most, or all of the bearing Branches have died; which has given Occasion to the Owner to imagine it was the Effect of a Blight, when in reality, it was only for want of right Management. And I am fully persuaded, half the Blights we hear complain'd of, proceed from nothing else but this.

These few Rules, well executed, together with a little Observation and Care, will be sufficient; and to pretend to prescribe particular Directions for all the different Accidents, or manner of treating Fruits, would be impossible; but I believe the Reader will find what has been said, if duly attended to, will answer his Design; for, without diligent Observation, there can be so such thing as a skilful Manager, let him have never so many or good Instructions laid down to him.

The *Bruxelles* and *Breda Apricocks*, being for the most part planted for Standards, will require very little Pruning or Management, only observe to take out all dead Wood, or such Branches as cross each other; this must be done early in *Autumn*, or in the *Spring*, after the cold Weather is past, that the Part may not canker where the Incision is made.

The *Bruxelles* is by far the most delicious Fruit of all the *Apricocks*, and is greatly mended by growing on a Standard: It is ripe about the Beginning of *August*, and is of a middling Size.

A P R I L.

Work to be done in the Kitchen and Fruit-Garden.

This Month commonly produces very unsettled Weather; sometimes the Weather is warm and kindly, with frequent, but gentle Showers of Rain; at other times, the Nights are frosty, with a continued dry Easterly Wind, which is very hurtful to the Fruit and Kitchen Garden.

In the Beginning of this Month, make Ridges for *Melons* and *Cucumbers*, for Bell or Hand-Glasses, which Work may be continued to the End of the Month, where large Quantities are required.

Sow *Thyme*, *Summer Savory*, *Purslain*, and other Sorts of tender Seeds, which would not bear the open Ground earlier in the Year.

Plant *Kidney Beans* in a warm Place, and a dry Soil; and continue hoeing your Crops of *Radishes*, *Carrots*, *Onions*, *Parsnips*, &c. leaving them at proper Distances, stirring all the Ground round them, and cutting up all Weeds lightly: This Work must be done only in dry Weather, and will be of great Service to your Crops, as also to preserve your Ground from Weeds the succeeding Months.

If the Weather is moist, plant Slips or Cuttings of *Sage*, *Rosemary*, *Savory*, or any other Sorts of sweet Herbs, which may also be deferred till next Month, if the Weather is dry, or other Business prevent you.

Plant *Garden Beans* for a latter Crop, and

continue sowing your Crops of large *Pease*, to succeed those sowed in the last Month; and sow *Celery* in a shady Border.

You may also continue to plant *Artichokes*, and the latter Crop of *Cauliflowers*, upon a moist Soil; but upon a dry one, it was better if perform'd the last Month.

Young *Salleting* must now be sown every Week at least, for in a few Days it will be too large for use; and continue to sow *Lettuce* of all Kinds for late Cabbaging; and sow *Cardoons* for Blanching in *Autumn*.

After a Shower of Rain, draw the Earth up to the Stems of *Cauliflowers*, *Cabbages*, and *Artichokes*, which were planted the last Month; but observe not to let any of the Earth fall into the Heart of the Plants: Be careful also to destroy Snails, and other Vermin, which are invited abroad by kindly Showers at this Season.

If the Nights prove cold, you must be very careful to cover the Glasses over your early *Melons* and *Cucumbers*, for the young Fruit is very subject to drop off where the Beds are grown cool, or proper Coverings are wanting.

In the Beginning of this Month, you may graft some late Fruits, and the variegated *Hollies* may now be grafted upon Stocks of the plain Sort.

Look carefully to your young *Fruit-Trees*, and if the Weather prove very dry, water them gently all over, especially if you find the Leaves inclinable to curl up: This may be also done to grown Trees, many times to great Advantage, but never do it when the Sun shines hot, nor too late in the Evening, lest the Night should prove cold or frosty, which would endanger your Crop of Fruit.

Toward the latter End of this Month, you may begin to go over your Walls and *Espaliers* of *Fruit-trees*, training in the young Shoots, and displacing all fore-right or luxuriant ones, as they are produc'd; you may now also thin your early *Apricocks*; those you leave on will be greatly forwarded thereby.

Plant *Cuttings* of *Vines* in the Places where they are to remain, or in Nursery-beds for Removing: The Manner how it is to be perform'd is exhibited in the Article of *Vines*: You may also look over old *Vines*, and rub off all small and ill-plac'd Shoots, which now begin to appear.

In the middle of this Month, if the Weather is good, begin to uncover such *Fig-trees* as were screen'd with Reeds, &c. from the last Winter's Cold; but this must be done gradually, and not expose the tender Fruit suddenly to the Cold.

Work to be done in the Flower-Garden and Green-House.

Clean the Borders, in the *Pleasure-Garden*, of Weeds; after which, sow such *Annuals* as will grow in the common Ground, without a Hot-bed, as *Candy-tuft*, *Venus Looking-glass*, *Cyanus*, or *Bottles* of divers Colours, *Muscipula* or *Catch-fly*, *Dwarf Lychnis*, *Sweet Pease*, *Venus Navel-wort*, *Convolvulus minor*, *Flos Adonis*,

Adonis, *Lavatera*, or *Spanish Mallow*, *Carthamus* or *Bastard Saffron*, some *Hieraciums* or *Hawk-weeds*, with several other hardy annual Seeds, which will not bear transplanting.

In this Month sow in your Flower Nursery, to be transplanted at *Michaelmas* into your Borders in the Pleasure-Garden, the following Things:

Columbines of divers Kinds, *Canterbury Bells*, *Stock Gilly-flowers*, *Wall-flowers* of divers Kinds, *French Honey-suckles*, *Holly-hocks*, *Pinks* and *Carnations*, with many other hardy biennial Plants. You may, in the Beginning of this Month, sow some of the hardy Sorts of Annuals upon a little warm Dung, to forward their coming up; as *Africans*, *French Marigolds*, *Indian Pinks*, *Convolvulus major* of several Kinds; *Indian Cress*, both Sorts; *Balsamines*, *Marvel of Peru*, *Sweet Sultan*, with some others, which may be rais'd without the Help of Glasses, and will make stronger and hardier Plants, but will be somewhat later, which is no Disadvantage, in that they will supply the Decay of other Flowers, for which they are chiefly planted: Their Season is in *Autumn*, when other Flowers are past.

You must also make fresh Hot-beds, for transplanting such tender, annual, and other exotick Plants, as were sown the last Month, in order to bring them forward.

Transplant all Sorts of Ever-greens: This is the best Season for that Work, but do it in moist or cloudy Weather; and if the Ground is dry, you should open a large Hole where each Tree is to stand, pouring therein a great Quantity of Water, so as to render the Earth pappy, or like Mud; then place your Tree therein, and after you have fill'd in the Earth, make a hollow Basen round each Tree to hold Water, and cover the Surface of the Ground with rotten Dung round each Tree, and repeat your Waterings twice a Week, if the Weather should prove dry.

Your fine *Auricula's* now begin to shew their beautiful Flowers; you should therefore remove the Pots under some Cover, to preserve them from the Heat of the Sun and Rain, but let them have as much open free Air as possible: This Method will preserve their Flowers in full Perfection for a long time.

The fine Beds of *Anemonies*, *Tulips*, and *Ranunculus's*, should also be cover'd with Mats or Cloths, from the Sun and Rain; both of which, if they are expos'd to, will soon impair the Beauty of their Flowers.

Plant *Tuberoses* in Pots of good Earth, and plunge them into a Hot-bed to promote their Shooting.

Screen your Tubs of seedling *Auricula's* and *Polyanthus's* from the Heat of the Sun, which would otherwise destroy them all in one Day.

Set Sticks to your *Carnations*, and such other Plants as require to be supported, tying their Stems with Bais, or some other soft Thread thereto.

Cut *Phyllyrea's*, *Alaternus's*, or other rude Ever-greens, close to the main Stems, in order to renew their Figures.

Wash and clean the Heads and Stems of

your *Orange*, and other exotick Trees, from the Dust and Nastiness they may have gotten during their Confinement in the Green-house, and stir up the Earth on the Surface of the Pots, and add a little rotten Cow-dung thereto, which will greatly help your Trees.

The Weather being fair, you must now begin to open the Windows of your Green-house most Part of the Day, but do not suffer them to remain open in the Night.

The Bark-beds in the Stoves must be now renew'd, the Heat of the old Bark being almost worn out.

This being the Time when the *Anana's* produce their Flowers, great Care must be taken to preserve a kindly Warmth in the Bed both Day and Night, but be sure not to scorch them with too great Heat, which is equally hurtful to them, especially at this Season.

You may now graft *Oranges*, *Jasmines*, and other tender Plants, by Approach; but such as will take Buds are better that Way, for Trees inarch'd seldom unite so well, and rarely grow to any Substance.

Products of the Month of April, in the Kitchen-Garden.

All Sorts of young Plants for *Sallads* are now in Prime; and towards the latter End of the Month, the *Lettuce* which stood through the Winter, will Cabbage, and be fit for Use: Upon the Hot-bed, we have *Cucumbers*; and in the natural Ground, we have *Radishes*, *Spinage*, *Asparagus*, *Sprouts of Brocoli*, *Cabbages* and *Savoy's*, *Colworts*, some *Parasnips* and *Carrots*, if preserv'd in Sand in a cool Place, for such as remain'd in the Ground are now sprouted; young *Carrots* that were sown in *July*, and have endur'd the Winter, are now in Prime.

Flowers in Blow, in the Month of April.

Anemonies, *Ranunculus's*, *Polyanthus's*, *Auricula's*, *Crown-Imperials*, *Hepatica's*, *Hyacinths*, *Narcissus's*, *Jonquils*, *Tulips*, *Violets*, *Adonis Hellebori Radice*, *Muscaria*, *Dwarf Iris*, *Wall-flowers*, *Stock-Gilliflowers*, *Great Snow-drop*, *Spring Cyclamens*, *Spring Colchicum*, *Pulsatilla*, *Bulbous Fumitory*, *Double Ladies-Smocks*, *Starry Hyacinths*, *Dens Canis*, *Double Daisies*, *Fritillaria's*, *Gentianella*, *Double Caltha Palustris*, large Green-flower'd *Ornithogalum*, *Persian Lily*, *Double Saxafrage*, *Venetian Vetch*, with many others of less Note.

Trees and Shrubs now in Flower.

Lilac, with White, Purple, and Blue Flowers; *Persian Lilac*, with Privet Leaves, ditto with cut Leaves; *Laburnum's Bird-Cherry*, two Sorts; *Arbor Jude*, double blossom *Cherries*, single and double *Dwarf-Almonds*, *Hypericum Frutex*, *Honey-suckles*, *Cherry-plumb*, *Cock's-spur Hawthorn*, with some others.

In the Green-house and Stove, are now blowing,

Geraniums, two or three Kinds; *Ilex-leav'd Jasmine*, *Tree Candy-tuft*, *Aloe* and *Onion-leav'd African Asphodels*, *Tree Scabious*, *Cistus's*, *Anemo-*

Anemonespermus, two or three Sorts ; *Ficoides*, several Sorts ; *Aloes*, several Sorts ; *Coronilla*, with silver Leaves ; *Cytissus* ; *Aleppo Cyclamens* ; *Hermannia*, two Sorts ; *Colutea Æthiopica*, &c.

AQUIFOLIUM seu **AGRIFOLIUM** ; [of *'Axis*, a Prickle, and *folium*, Lat. a Leaf ; so call'd, because the Leaves are arm'd with many Prickles.] The Holly Tree.

The Characters are ;

The Leaves are set about the Edges with long sharp stiff Prickles ; the Berries are small, round, and for the most Part of a red Colour, containing four Triangular striated Seeds in each.

The Species are ;

1. **AQUIFOLIUM** ; *baccis rubris*. *H. L.* The Common Holly, with red Berries.
2. **AQUIFOLIUM** ; *baccis luteis*. *H. L.* Yellow Berried Holly.
3. **AQUIFOLIUM** ; *baccis albis*. White Berried Holly.
4. **AQUIFOLIUM** ; *foliis ex luteo variegatis*. *H. R. Par. Aquifolium aureum*. *Munt. H. 163.* Yellow blotch'd Holly.
5. **AQUIFOLIUM** ; *foliis ex albo variegatis*. *H. L.* White blotch'd Holly.
6. **AQUIFOLIUM** ; *echinata folii Superficie*. *Corn. 180.* Hedge-Hog Holly.
7. **AQUIFOLIUM** ; *echinata folii Superficie ; foliis ex luteo variegatis*. Yellow Blotch'd Hedge-Hog Holly.
8. **AQUIFOLIUM** ; *echinata folii Superficie ; limbis aureis*. Gold-Edged Hedge-Hog Holly.
9. **AQUIFOLIUM** ; *echinata folii Superficie ; limbis argenteis*. Silver-Edged Hedge-Hog Holly.
10. **AQUIFOLIUM** ; *foliis longioribus, limbis & spinis ex unico tantum latere per totum argenteo pictis*. *Pluk. Alm. 38.* *BRODERICK'S* Holly ; *vulgô.*
11. **AQUIFOLIUM** ; *foliis subrotundis ; limbis & spinis, utrinque argentatis ; Aquifolium elegans*. *D. Doct. Eales. Pluk. Alm. 38.* *EAL'S* Holly ; *vulgô.*
12. **AQUIFOLIUM** ; *foliis oblongis lucidis ; spinis & limbis argenteis*. *Sir THOMAS FRANKLIN'S* Holly ; *vulgô.*
13. **AQUIFOLIUM** ; *foliis oblongis, spinis & limbis argenteis*. *Hertfordshire* White Holly.
14. **AQUIFOLIUM** ; *foliis subrotundis, limbis argenteis ; spinulis & marginalibus purpurascens*. *BRIDGMAN'S* Holly ; *vulgô.*
15. **AQUIFOLIUM** ; *foliis oblongis, spinis & limbis flavescentibus*. *LONGSTAFF'S* best Holly ; *vulgô.*
16. **AQUIFOLIUM** ; *foliis oblongis lucidis, spinis & limbis aureis*. *BRADLEY'S* best Holly ; *vulgô.*
17. **AQUIFOLIUM** ; *foliis oblongis, spinis & limbis aureis*. *WISE'S* Holly ; *vulgô.*
18. **AQUIFOLIUM** ; *foliis subrotundis, spinis minoribus ; foliis ex luteo elegantissimè variegatis*. The British Holly ; *vulgô.*
19. **AQUIFOLIUM** ; *foliis oblongis atrovirentibus, spinis & limbis aureis*. *BAGSHOT* Holly ; *vulgô.*

20. **AQUIFOLIUM** ; *foliis latissimis ; spinis & limbis flavescentibus*. *Glory of the East* Holly ; *vulgô.*

21. **AQUIFOLIUM** ; *foliis oblongis, spinis majoribus, foliis ex aureo variegatis*. *Glory of the West* Holly ; *vulgô.*

22. **AQUIFOLIUM** ; *foliis subrotundis ; spinis & limbis aureis*. *ASLET'S* Holly ; *vulgô.*

23. **AQUIFOLIUM** ; *foliis longioribus ; spinis & limbis argenteis*. The Union Holly ; *vulgô.*

24. **AQUIFOLIUM** ; *foliis & spinis majoribus ; limbis flavescentibus*. *Fine PHYLLIS* Holly ; *vulgô.*

25. **AQUIFOLIUM** ; *foliis minoribus ; spinis & limbis argenteis*. *Painted Lady* Holly ; *vulgô.*

26. **AQUIFOLIUM** ; *foliis angustioribus ; spinis & limbis flavescentibus*. *FULLER'S* Cream Holly ; *vulgô.*

27. **AQUIFOLIUM** ; *foliis oblongis, ex luteo & aureo elegantissimè variegato*. *Milk Maid* Holly ; *vulgô.*

28. **AQUIFOLIUM** ; *foliis oblongis viridibus ; maculis argenteis notatis*. *CAPEL'S* motled Holly ; *vulgô.*

29. **AQUIFOLIUM** ; *foliis oblongis, spinis & limbis luteis*. *PARTRIDGE'S* Holly ; *vulgô.*

30. **AQUIFOLIUM** ; *foliis oblongis, spinis & limbis ocrulatis*. *MASON'S* Copper-colour'd Holly ; *vulgô.*

31. **AQUIFOLIUM** ; *foliis parvis, interdum vix spinosis*. *Box* Leav'd Holly ; *vulgô.*

32. **AQUIFOLIUM** ; *foliis parvis, interdum vix spinosis, limbis foliorum argentatis*. *WHITMILL'S* Holly ; *vulgô.*

33. **AQUIFOLIUM** ; *Carolinianum ; angustifolium, spinis raris brevissimis*. *CAROLINA* Holly, with smooth Leaves ; *vulgô.*

This Tree, tho' wild in many Parts of *England*, deserves a Place in large Gardens, as being very Ornamental to the Wilderness and ever-green Garden ; but especially when we take in the large Variety of beautiful variegated Sorts, of which we have a much greater Number than is to be found in any Part of *Europe* : These are all distinguish'd by the different Names of the Persons who first observ'd them, or from the Places where they grew.

I have seen in one Garden, viz. *Mr. Christopher Gray's*, near *Fulham*, above thirty different Varieties, which are either strip'd or blotch'd, with White, Yellow, or Copper Colour.

These Trees were formerly in much greater Request than at present, and there was scarcely a small Garden of any Worth, but was fill'd with these Trees, which were clipp'd either into Pyramids, Balls, or some other Figures ; but as this was crowding a Garden too much with one Sort of Plant, and the Fashion of clipp'd Greens going off, so now they are almost wholly neglected : Such are the Changes in Mens Tempers and Fancies, that what is one Year esteem'd, is the next despis'd.

I would not here be thought to be an Advocate for clipp'd Trees ; no, I am infinitely more delighted with a Tree in all its Luxuriency of Branches, waving about with every Gust of Wind ; but yet I think there is a great Beauty in these Trees, if rightly dispos'd in a Garden, but more-especially in such as are of a large Extent, by being intermix'd with other Sorts of Ever-greens, to form regular Clumps, or plac'd in Quarters of Ever-greens, or to form Columns at the Entrances of Wilderness Quarters, or to plant in Niches of Ever-green Hedges ; in all which Places they have an agreeable Effect.

All the variegated Sorts are propagated by budding or grafting them on the *Plain Holly* Stocks ; the best Time for budding them, is in *July*, and for grafting them, in *March*.

The Manner of raising the common *Hollies*, is by sowing the Berries, which, if sown as soon as ripe, will lie two Years in the Ground ; you may therefore mix the Berries with dry Sand, and put them in a large Garden Pot, burying it in the Ground till the next *August* or *September* ; and take them out and sow them on a Bed of common Earth, covering the Seeds about a quarter of an Inch with light Mould, and the Spring following the Plants will appear above Ground : But as this is a tedious Method, and the young Plants making but small Progress for the two or three first Years, so I would rather advise the Purchasing of young Stocks, of about three or four Years Growth, of some Nursery Men who raise them for Sale, and these will be fit to bud or graft the second Year after they are planted ; or you may purchase young Plants, of the several Kinds, as have been budded or grafted two Years, which are generally sold very reasonably in the Nurseries, than to hazard the Budding them yourself, especially if you are not sure of being provided with Cuttings very near you.

Hollies are also planted for Hedges, and have been by some very much esteem'd for that Purpose ; but the Leaves being very large, when these Hedges are clipp'd, they are generally cut in Pieces, and appear very ragged, otherwise they make a very durable strong Hedge, and very proper for an outside Fence of a Green Garden.

The best time for transplanting this Tree is in *April*, in moist Weather ; and if the Season is good, and they are carefully remov'd, there will be little Danger of their growing ; they may also be transplanted in *August*, if the Season proves moist, and they will put out new Roots before Winter ; but if you do it at this Season, you must be careful to mulch the Ground about the Roots, to keep the Frost from reaching them in Winter, which would be apt to destroy your new-planted Trees.

If the Trees are large you intend to remove, and have been growing some time in the Places where they stand, you should dig about them, and cut their Roots the Year before, that they may produce young Fibres, to keep the Earth from falling away from the Roots ; and if you remove them to any Distance, it will be ad-

viseable to put them into Baskets ; and when you plant them, you may either cut off the Sides of the Basket, or if they are but loosely made, suffer them to remain intire, for they will soon rot in the Ground.

You must also be very careful to supply your new-planted *Hollies* with Water, for the two first Years, if the Seasons prove dry ; after this time there will be little Danger of their miscarrying.

AQUILEGIA ; [is call'd also *Aquilina*, of *Aquila*, *L.* an Eagle, because the Flower resembles an Eagle : *Fabius Columna* says, it is the *Iopysus* of *Dioscorides*, and demonstrates it to be so call'd, because the little Sheaths rise after that Manner.] Columbine.

The Characters are ;

It hath Leaves like the Meadow Rue ; the Flowers are pendulous, and of an anomalous Figure ; the Pistil of the Flower becomes a membranous Fruit, consisting of many Husks or Pods ; each of which contains many shining black Seeds.

The Species are ;

1. **AQUILEGIA** ; *silvestris*. C. B. The Common wild Columbine.

2. **AQUILEGIA** ; *stellata*, *flore violaceo*. Hort-Eyst. The starry Columbine, with violet colour'd Flowers.

3. **AQUILEGIA** ; *bortenfis simplex*. C. B. The single Garden Columbine.

4. **AQUILEGIA** ; *montana magno flore*. C. B. Mountain Columbine, with large Flowers.

5. **AQUILEGIA** ; *Canadensis, praeox prae-rrior*. H. R. Par. Early flowering Canada Columbine.

6. **AQUILEGIA** ; *pumila praeox, Canadensis*. Cernut. Dwarf early-flowering Canada Columbine.

7. **AQUILEGIA** ; *bortenfis, multiplex, flore magno caeruleo*. C. B. Double Garden Columbine, with large blue Flowers.

There are great Varieties of this Plant, which are preserv'd in curious Gardens ; the Flowers of which are very double, and beautifully variegated with Blue, Purple, Red and White. These are very ornamental Plants in Borders of large Gardens, producing their beautiful Flowers in *May* and *June* ; and are very proper to mix with other Flowers, for Pots to adorn Chimnies or Halls, at that Season.

They are all rais'd by sowing the Seeds, or parting the old Roots, but the former Method is chiefly practis'd ; for the old Roots are very apt to degenerate after they have blown two Years, and become quite plain.

The Seeds should be sown in a nursery Bed in *August* or *September* ; for the Seeds kept till Spring do seldom grow well ; in the *March* following your young Plants will appear above Ground, you must therefore clear them from Weeds, and if the Season should be dry, refresh them with Water, that they may gather Strength.

In the Beginning of *May* these Plants will be strong enough to transplant ; you must there-

therefore prepare some Beds of good fresh undung'd Earth, planting them therein at eight or nine Inches Distance every way, keeping them clear from Weeds, and refreshing them with a little Water, as they may require it.

At *Michaelmas* you may remove them into the Borders of your Flower Garden, and the *May* following they will produce Flowers; but if you intend to maintain their Roots, you should not suffer them to feed, but crop off all their Flower-Stems so soon as the Flowers are past.

But in order to be sure of having no single or bad Flowers in your Borders, you may suffer them to remain in the nursery Beds until they have blown, at which time you may stick a Stake by each Root you fancy to preserve, and pull out all the single or bad colour'd ones, and throw them away, cutting off all the Flowers from your best Roots so soon as they have shewn themselves, which will greatly add to the preserving them fair in their Colours; and these Roots will be strong enough to divide at *Michaelmas*, when you may transplant them into your Borders, but do not divide them too small, which will weaken their Bloom the succeeding Year.

In order to keep up a Succession of good Flowers, you should sow fresh Seeds every Year; and if you can meet with a Friend, at some Distance, who is furnish'd with good Flowers of this Kind, it will be very advantageous to both Parties, to exchange Seeds once in two Years, by which Means they will not be apt to degenerate into plain Colours.

ARALIA, Berry-bearing *Angelica*.

The Characters are;

The Flower consists of many Leaves, which expand in Form of a Rose, which are naked, growing on the Top of the Ovary: These Flowers are succeeded by globular Fruit, which are soft and succulent, and are full of oblong Seeds.

The Species are;

1. ARALIA; *Canadensis*. Tourn. Canada Berry-bearing *Angelica*.

2. ARALIA; *caule aphylio, radice repente*. D. Sarrazin. Tourn. Berry-bearing *Angelica*, with a naked Stalk and a creeping Root.

3. ARALIA; *arborescens, spinosa*. Vuill. *Angelica*-Tree, *vulgô*.

The two first Species die to the Surface every Year, and rise again the succeeding Spring, and in *July* and *August* produce their Flowers; and, if the Season is warm, do perfect their Fruit in *September*.

These are propagated either by sowing their Seeds, or by parting of their Roots; which last being the most expeditious Method, is commonly practis'd in *England*; for the Seeds often abide in the Ground until the second Year before they arise, and are two Years more before they flower.

They love a good fresh Soil, not too wet, and should be planted early in the Spring, and are very hardy in respect to Cold.

The third Sort grows with us to the Height of seven or eight Feet: It has produc'd Flowers

in the *Physick-Garden* at *Chelfea* two or three times, but has not perfected its Seeds in *England* that I have yet heard.

This Shrub requires a dry Soil, and a warm Situation, otherwise it is subject to be injur'd by Frosts in the Winter: This is only propagated by Seeds, which are frequently brought from *America*.

ARBOR, a Tree; is defin'd to be a woody Plant, the biggest of all in Thickness and Height, whole Stock is perennial and single by Nature, which is divided into many larger Branches, which the *Greeks* call *Ἀρβύρα* and *ἄρβυ*, and afterwards into many small Branches, [Sprigs] which the *Greeks* call *κλάδεις*, and the *Latins* *Sarculos*.

ARBOR CAMPHORIFERA, *vide* Camphorifera.

ARBOR CORAL, *vide* Corallodendron.

ARBOR JUDÆ, *vide* Siliquastrum.

ARBOR VIRGINIANA, *Citrea vel Limoniae folia, Benzoinum fundens*. H. A. The Benjamin-Tree, *vulgô*.

This Tree is found in great Plenty in most Parts of *Virginia* and *Carolina*, from whence it is brought to *England*, and was for several Years preserv'd in Pots, and hous'd in Winter, but hath been since found to be hardy enough to resist the severest Cold of our Winters in the open Ground.

This Plant may be propagated by laying down the young Branches in the Spring of the Year, which, if they are supply'd with Water in a dry Season, will be rooted enough by the next Spring to transplant.

These Trees produce small yellowish Flowers out of the young Wood, at two Seasons, viz. in *March* and *October*, but I never saw any Fruit succeed them. This Tree is kept in curious Gardens of Trees amongst many other of the same Country, but I don't know any extraordinary Beauty or Use that belongs to it: Indeed, when it was first introduc'd, it was generally believ'd, that the Gum *Benjamin* of the Shops was an Exudation from this Tree, but it is now thought to proceed from a very different Tree.

An. ARBOR *Zeylanica, Cotini foliis, foliis lanigine villosis floribus albis cuculi modo lacinatis*. Pluk. Phyt. The Snow-drop Tree, *vulgô*.

This Tree is very hardy in respect to Cold, standing abroad in the open Air, without suffering from our severest Frosts, but is difficult to increase, the Layers being commonly two Years before they strike Root, nor will they root at all, unless the Branches are very young, and they are slit at a Joint, as is practis'd in laying of Carnations. When these Layers are rooted, they may be transplanted into small Quarters of flowering Shrubs, where, amongst those of a middling Growth, this Tree will add to the Variety.

ARBO-

ARBOREOUS, [*Arboreus*, *Lat.* of or belonging to, or of the Nature of Trees.] An Epithet which Botanists apply to those *Fungus's* or *Mosses* which grow on Trees, in Distinction from those that grow on the Ground, as *Agaric*, *Jew's-Ear*, &c.

ARBOURS, [*Arborea* of *Arbor*, *Lat.*] These were formerly in greater Esteem with us than at present; few Gardens were without cover'd Arbours and shady Seats, but of late they have been much rejected, and that not without good Reason; for besides the great Expence in their first erecting, they were a continual Charge in keeping them repair'd, for the Wet soaking thro' the Leaves of the Trees to the Wood-work, was, by the continual Shade, and for Want of free Air, detain'd so long as to rot the Wood (which if wholly expos'd to the Weather, would have lasted seven or eight Years) in two or three; beside, the Seats are continually damp, and unhealthy; for which Reason, cover'd Seats or Alcoves are every where at this Time preferr'd to them.

Arbours are generally made of Lattice-work, either in Wood or Iron, and cover'd with *Elms*, *Limes*, *Horn-beam*, or with *Creepers*, *Honey-suckles*, *Jasmines*, or *Passion-flowers*, either of which will answer the Purpose very well, if rightly manag'd.

ARBUTUS; The Strawberry-Tree.

The Characters are;

It is ever-green; the Leaves are roundish, and serrated on the Edges; the Flowers consist of one Leaf, and are shap'd like a Pitcher; the Fruit is of a fleshy Substance, and, in its outward Appearance, very like a Strawberry, but is divided into five Cells, in which are contain'd many small Seeds.

The Species are;

1. **ARBUTUS**; *folio serrato*. C. B. The common Straw-berry-Tree.
2. **ARBUTUS**; *folio serrato; flore oblongo, fructu ovato*. Michel. Hort. Pis. Strawberry-Tree, with longer Flowers and Egg-shap'd Fruit.
3. **ARBUTUS**; *folio serrato; flore duplici*. Strawberry-Tree, with double Flowers.

This Tree has its Name from the Resemblance the Fruit bears to that of a *Strawberry*, but it is of an austere sower Taste; tho' I have been inform'd, that in *Ireland*, where this Tree abounds, the Fruit is sold, and eaten. In *England* they are chiefly brought to the Markets with small Branches of the Tree, having small Bunches of Flowers upon them, and made up into Nosegays with other Flowers, and some Sprigs of the *Anomum Plinii*, or *Winter Cherry*, which at that Season is very acceptable, when there are few Flowers to be had.

The Time of this Fruit being ripe, is in *November*, at which Season the Flowers are blown for the next Year's Fruit; so that from the Time of flowering to the ripening of the Fruit, is one whole Year.

The best Method of propagating these Trees is, by sowing their Seeds, which should be preserv'd in dry Sand till *March*; at which Time you should sow them upon a very moderate Hot-bed, (which greatly promotes its Vegetation) covering it about a quarter of an Inch with light Earth, and screening it from Frosts or great Rains: Toward the Middle or latter End of *March* your young Plants will begin to appear; you must therefore keep them clear from Weeds, and give them frequent Waterings, as the Season may require; and if your Plants have done well, they will be, by *Autumn*, about five or six Inches high: But as these Trees are subject to receive Damage from Frosts, especially while they are young, therefore you must hoop the Bed over, that when bad Weather comes, you may cover it with Mats and Straw to keep out the Frost.

The Beginning of *April* following, you may transplant these Trees, each into a small Pot; but in doing of this, be very careful to take them up with as much Earth to their Roots as possible, for they are bad rooting Plants, and very subject to miscarry on being remov'd; and 'tis for this Reason that I advise their being put into small Pots; for when they have fill'd the Pot with Roots, they may be turn'd out into large Pots, or the open Ground, without any Hazard of their dying.

When you have put your young Plants into the small Pots, you should plunge them into another very moderate Hot-bed, to encourage their taking new Root, shading them from the Sun in the middle of the Day, and giving them Water as they may require: In this Bed it will be proper to let the Pots remain most part of the Summer; for if the Pots are taken out, and set upon the Ground, the Smallness of their Size will occasion the Earth in them to dry so fast, that watering will scarcely preserve your Trees alive; but if they are kept growing all the Summer, they will be near a Foot high by the next Autumn; but it will be adviseable to screen them from the Frost during their Continuance in Pots, by plunging them into the Ground in a warm Place, and covering them with Mats in bad Weather.

When your Trees are grown to be three or four Foot high, you may shake them out of the Pots into the open Ground in the Places where they are to remain; but this should be done in *April*, that they may have taken good Root before the Winter, which would be apt to damage them if newly planted.

These Trees are tolerably hardy, and are seldom hurt, except in extream hard Winters, which many times kills the young and tender Branches, but rarely destroys the whole Trees; therefore however dead your Trees may appear after a hard Winter, yet I would advise you to let them remain till the succeeding Summer has sufficiently demonstrated what are living, and what are dead; for the Winter *Anno 1728-9*. gave us great Reason to believe most of the Trees of this Kind were destroy'd, and many People were so hasty, as to dig up, or cut down many of their Trees; whereas all those People who had Patience to let

let

let their Trees remain, found, that scarce one in five hundred fail'd to come out again the next Summer, and made handsome Plants that Season.

ARCUATION; [of *Arcus* a Bow; of *Arcuo*, Lat. to bend or bow like an Arch.] The Raising of Trees by Layers.

The first Thing that is to be done, is, to procure large strong Mother Plants, which are usually call'd *Stools*. It is no matter whether the Trees be crooked, or otherwise deform'd; and the larger they are, the better they are to be cut down close to the Ground. They are to be planted in a Border six Feet wide, and in a strait Line six Feet asunder.

The Border must be well trench'd, or dug clear from all *Roots*, *Clods*, *Stones*, or any other Obstructions. These Trunks or *Stools* being planted in this Trench, will throw out twenty, thirty, forty or fifty Plants, which may be begun to be laid about the *Michaelmas* following; at which Time, if the *Stools* have been carefully manag'd, they will have shot five, six, or more main Branches out of the Root, and on every one of these, as many Side or Collateral Branches.

These main Branches must be bent down to the Ground; and some cut them half through, that they may bend the easier.

When the main Branches are thus laid round the Stool, and pegg'd fast down, then the small ones may be pegg'd down too, if you please; and thus the *main Branches* or *Shoots* will be cover'd all over, except the very Top, and all the *small* and *side Branches* must be cover'd two or three Inches thick upon the Joints: Some Persons give the Branches a Twist, in order to make them take Root the sooner. If they be mulsh'd, or some strawy Dung be laid over them, it will be of Use to keep them moist: They ought also to have a large Pan made round them to hold the Water, in order to water them the ensuing Summer, which they will require at least two or three times a Week, if the Weather be hot and dry.

About the Middle of *September* following, they may be open'd and examin'd, to see if they have taken Root or not, which it is very probable they will have done; but if not, they must be let alone to lie till the next Spring, and then they are to be taken up and planted in the Nursery.

This may be done to the *Dutch*, *Witch* and *English Elm*, the *Abeal*, *Lime*, *Alder*, *Platanus*, and all Sorts of *Sallows* and *Willows*.

AREA, is the internal Capacity, or Content of any given Boundary or Limits, of what Figure or Shape soever it be.

ARGEMONE, [of *ἄργαμα*, because it purges away the Mistiness of the Eyes: It is call'd the *Infernal Fig*, because the *Capsule* pretty much resembles a Fig; and *Infernal*, from its Asperity.] Prickly Poppy.

The Characters are;

It hath an annual Root: The Leaves are lacinated, or jagged; which are terminated with Spines: The Flower consists of many Leaves, which expand in Form of a Rose: The Pointal of the Flower becomes a large trigonical Vessel, which is divided into three Cells, wherein are contain'd many globular black Seeds.

There is but one Species of this Plant known, which is,

ARGEMONE; *Mexicana*, Tourn. The Prickly Poppy.

This is an annual Plant which is very common in most Parts of the *West-Indies*, and is by the *Spaniards* call'd, *Fico del Inferno*, or the *Devil's Fig*; there is no great Beauty nor Use in this Plant amongst us, that I know of; but whoever hath a mind to cultivate it, should, at first, sow it on a Hot-bed, and in *June* transplant it out into the natural Borders, where, when once it has shed its Seed, there will not want a Supply of Plants for several Years after. I have been informed that *Gum-bouge* is made from the Juice of this Plant.

ARGIL; [*Argilla*, Lat. a sort of white Earth like Chalk, but more brittle.] Potters Clay.

ARIA THEOPHRASTI; vide **CRA-TÆGUS**.

ARISARUM; The Herb Friar's Cowl.

ARISTA, of Corn, is that sharp-pointed Needle that stands out from the Husk or Huse of the Grain; the Beard or Awn of Corn, which the *French* call, *La Barbe du Blé*.

ARISTOLOCHIA; [*Ἀριστολόχια* of ἀρισ- best, and λόχια Purgations, which come forth after the Birth; as tho' it was the best Herb to expel the After-Birth.] Birthwort.

The Characters are;

The Stalks are flexible; the Leaves are plac'd alternately on the Branches; the Flowers consist of one Leaf, and are of an anomalous Figure, hollow'd like a Pipe, and shap'd like a Tongue, generally booked: The Flower-Cup turns to a membranous, and, for the most part, oval-shap'd Fruit, which is divided into five Cells, and full of flat Seeds.

We have three or four Species of this Plant in the curious Gardens of Botany; which are,

1. **ARISTOLOCHIA**, *flore ex purpurâ nigro*. C. B. P. The round-rooted Birthwort.

2. **ARISTOLOCHIA**; *clematitis refra*. C. B. P. The Climbing Birthwort.

3. **ARISTOLOCHIA**, *Pistolocchia dicta*. C. B. P. Spanish Birthwort.

4. **ARISTOLOCHIA**, *Pistolocchia dicta*, *Cretica*, *folio smilacis sempervirens*. H. L. The Ever-green Birthwort from Crete.

The first and second of these *Species* are sometimes used in Medicine; the third and fourth Sorts are preserv'd in Botanick Gardens as Curiosities; the fourth Sort has been by several People thought to be the true *Snake-Root*: But this is known to be a Mistake.

The two first Sorts are very hardy, and are easily propagated by parting their Roots; but the third and fourth Sorts are tender, and must be shelter'd in Winter from the severe Frost, but are tolerably hardy, and have, in moderate Winters, stood abroad in a Border under a warm Wall: The last Sort I receiv'd from the Curious Mr. Henry Hopkey, who gather'd it upon Gibraltar Hills, Anno 1727.

ARMENIACA; Apricock.

ARMERIUS; Sweet William; vide *Caryophyllus Barbatus*.

ARTEMISIA, [*Artemisa*, Gr. so call'd, according to some, of *Artemisia* Wife of *Maulolus* King of *Caria*, who brought this Plant into Use, and adopted it as her's; when before it was call'd *Parthenis*, the Virgin Goddess being feign'd to have given that Name to it; others derive it of *Aptus Diana*, because good for Diseases of Women.] *Mugwort*.

The Characters are;

The Flowers and Fruit of this Plant are very like those of the *Worm-wood*, but grow erect upon the Branches: The Florets are of a purplish Colour; and the Leaves, for the most part, terminate in sharp Point, are cut into many Segments, and are of a dark Green on the upper Side, and hoary on the under Side.

The Species are;

1. ARTEMISIA; *vulgaris, major, caule & flore purpurascens*. C. B. Common great *Mugwort*, with purplish Stalks and Flowers.
2. ARTEMISIA; *vulgaris, major, caule ex viridi albicante*. Tourn. Common great *Mugwort*, with whitish green Stalks.
3. ARTEMISIA; *foliis ex luteo variegatis*. H. R. P. The yellow strip'd *Mugwort*.
4. ARTEMISIA; *foliis ex albo variegatis*. The white strip'd *Mugwort*.

The first of these *Species* is very common upon dry Banks and Dung-hills in divers Parts of *England*, and is rarely admitted into a Garden. The second Sort is a Variety of the first, which is rarely found in *England*: But the third and fourth Sorts are only preserv'd in Gardens for the Beauty of their variegated Leaves. These Sorts may also be propagated by parting of their Roots either in Spring or Autumn, and will grow in almost any Soil or Situation; but as they are subject to spread very far, and soon over-run a large Spot of Ground, so they should be confin'd by cutting off their side Shoots to keep them within Compass; nor should they be planted too near to other Plants, lest, by their spreading Roots, they should over-bear and destroy them.

The first *Species* of this Plant is used in Medicine: The Plant is commonly gather'd

by the Herb-women in the Fields, and brought to the Markets: It is from one *Species* of *Mugwort*, (and not improbably the first) that the famous *Moxa*, which is used to burn for curing the Gout, is taken, it being the *Lanugo* or downy Substance which adheres to the under Part of the Leaf.

ARTICHOKE, is call'd by the *Latins* *Cinara*.

The Characters are;

It is very like the Thistle, but hath large scaly Heads, which are shap'd somewhat like the Cone of the Pine-tree; the Bottom of each Scale, as also at the Bottom of the Florets, is a thick fleshy eatable Substance.

The Species are;

1. CINARA; *bortensis; foliis aculeatis & non aculeatis*. C. B. The Garden Artichoke, with prickly and smooth Leaves.
2. CINARA; *bortensis; non aculeata, capite subrubente*. H. R. P. Garden-Artichoke, without Prickles, and reddish Heads.
3. CINARA; *sylvestris, Batia*. Clus. Cur. Poet. The wild Artichoke of *Bætia*.

I thought proper to introduce this Class under the Name *Artichoke*, which being the generally receiv'd Name of the only valuable Species, it might be better here plac'd than under the *Latin* Name.

ARTICHOKE.

There is at present but one Sort of *Artichoke* cultivated in the Gardens near *London*, which is that commonly known by the Name of the *Red Artichoke*; formerly the green Sort was the most common, but since the red Sort hath been introduc'd, the other has been rejected, as being vastly inferior in Goodness thereto.

The Manner of propagating this Plant, is from Slips or Suckers taken from the old Roots, in *February* or *March*, which, if planted in a good Soil, will produce large fair Fruit the Autumn following: But as this is a Plant which few Gardeners that have not been instructed in the Kitchen Gardens near *London*, understand to manage well, so I shall be the more particular in my Directions about it.

At the latter End of *February*, or in *March*, according to the Goodness of the Season, or Forwardness of the old *Artichoke* Stocks, will be proper time for dressing them, which must be thus perform'd, with your Spade remove all the Earth from about your Stock, down below the Part from whence the young Shoots are produced, clearing the Earth from between the Shoots, so as to be able to judge of the Goodness of each, with their proper Position upon the Stock; then make Choice of two of the clearest, straightest, and most promising Plants that are produc'd from the under-part of the Stock, which you are to let remain for a Crop; then with your Thumb, force off all the other Plants and Buds, close to the Head of the Stock from whence they are produc'd, and with your Spade draw the Earth about the two Plants which are left, and

and with your Hands close it fast to each of them, separating them as far asunder as they can conveniently be plac'd without breaking them, observing to crop off the Tops of the Leaves which hang down, with your Hands: Your Ground being levell'd between the Stocks, you may sow thereon a small Crop of Spinage, which will be taken off before the *Artichokes* will cover the Ground; and be sure to keep them clear from Weeds; and toward the latter End of *April*, or the Beginning of *May*, when your Plants begin to shew their Fruit you must carefully look over your Stocks, and draw up all young Plants from them, which may have been produc'd since their Dressing, and cut off all Suckers which are produc'd from the Stems of the *Artichokes*, leaving only the principal Head, by which means your Fruit will be the larger; when your *Artichokes* are fit to gather, you must break, or cut them down close to the Surface of the Ground, that your Stocks may make strong fresh Shoots before *October*, which is the Season for Earthing, or, as the Gardeners term it, Landing them up: which is thus done;

Cut off all the young Shoots quite close to the Surface of the Ground, then dig between every Stock, raising all the Earth between each Row of Stocks into a Ridge, as is done in the common Method of trenching Ground, so as that the Row of *Artichokes* may be exactly in the Middle of each Ridge; this will be sufficient to guard them against Frost: And I would here recommend it to the Publick, as infinitely preferable to long Dung, which is by the Unskilful often used, and is the Occasion of their Fruit being small, and almost without any Bottoms to them; for there is not any thing so hurtful to these, as new Dung being either buried near, or laid about them. Observe, that altho' I have mention'd *October* as the Season for Earthing them, yet if the Weather proves mild, it may be deferr'd till any time in *November*.

When you have thus earth'd them up, you have nothing more to do till *February* or *March*, by which time they will have grown through the Ridge of the Earth; and when the Weather is proper, must be dress'd as was before directed.

When you have a Mind to make a new Plantation, after having digged and buried some very rotten Dung in the Ground you have allotted for that Purpose, make choice of such of your Plants as were taken from your old Stocks, which are clear, sound, and not woody, having some Fibres to their Bottom; then with your Knife cut off that knobbed woody Part, which join'd them to the Stock, and if that cuts crisp and tender, it is a Sign of its Goodness, but if tough and stringy, throw it away as good for nothing, and cut off the large outside Leaves pretty low, that the Middle, or Heart Leaves, may be above them; your Plants being thus prepar'd (if the Weather is very dry, or the Plants have been any time taken from the Stocks, it will be convenient to set them upright into a Tub of Water for three or four Hours before they are planted, which will greatly refresh them) you

must then proceed to Planting, which must be done by ranging a Line cross the Ground, in order to their being plac'd exactly in a Row, and with a measure Stick plant them at two Foot Distance from each other in the Rows; and if design'd for a full Crop, five Foot Distance Row from Row; your Plants must be set about four Inches deep, and the Earth closed very fast to their Roots, observing, if the Season proves dry, to keep them water'd two or three times a Week, until they are growing, after which they seldom require any.

N. B. You might sow a thin Crop of Spinage upon the Ground before you plant your Plants, observing to clear it from about them after it is come up.

These Plants, in a kindly Season, or a moist Soil, will produce the largest and best *Artichokes*, some time in *August* and *September*, after all those from the old Stocks are past; so that if you intend to continue your *Artichokes* thro' the whole Season, you must plant fresh every Year, otherwise you can't possibly have Fruit longer than two Months.

If any of the Plants which you planted in the *Spring*, should not Fruit in the *Autumn*, you may, at the Season of Earthing your Roots, tie up the Leaves with a small Willow Twig, &c. and lay the Earth up close to it, so that the Top of the Plant may be above Ground; and when the Frost comes on, if you will cover the Top with a little Straw, or Pease Haulm, these Plants will produce Fruit in *Winter*, or early in the *Spring*.

But if you intend to plant other Things between your *Artichokes*, you must allow nine or ten Foot between the Rows, as is often practis'd by the Kitchen Gardeners near *London*, who sow the Ground between with Radishes or Spinage, and plant two Rows of Cauliflowers, at four Foot Distance Row from Row, and two Foot and a half Distance in the Rows between them; so that there is always five Foot allow'd for the *Artichokes* to grow; and in *May*, when the Radishes or Spinage are taken off, they sow a Row of Cucumbers for Pickling, exactly between the two Rows of Cauliflowers, and at three Foot Distance from each other; and between the Rows of Cauliflowers and the *Artichokes*, plant a Row of Cabbages or Savoys for Winter Use, which, when the Cauliflowers are drawn off, and the *Artichokes* gather'd, will have full Liberty to grow; and by this means the Ground is fully employ'd thro' the whole Season.

In those which are planted at five Foot Distance Row from Row, you may plant in every other Row, a Line of Cabbages or Savoys, for Winter Use, which will be gone by the Time of landing them up; in the doing of which, you must lay the whole five Foot of Earth into one Ridge, except the Ground be extreme stiff, or the Plants young, in both which Cases you may lay only three Feet and a half; the same Compass of Ground must also be allow'd where they are planted at a wider Distance.

And, if in the *Spring*, you find your Stocks shoot very weak, which may have been occasion'd either

either by hard Frosts, or too much Wet, you must then uncover them, and with your Spade loosen and break the Earth about them, raising a small Hill about each Stock, levelling the rest between the Rows, which will greatly help them, and in three Weeks time after are commonly fit to slip.

ARTICHOKES of *Jerusalem*; vide *Corona Solis*.

ARTICULATION, is the Connection of Parts that consist of Joints, or Knees; such as are the *Siliques* [the Husks] of many Plants, as of the *Ornithopodum*, *Coronilla*, *Scurridaca*, which are joined together by a soluble Knot; whence those Parts are call'd *Articulose*, and are said to be connected *Articulatim* or *Geniculatim*: And also those Parts of Plants which have the same Form, are call'd *Articulose*, altho' they have no Joints; so the Root of *Polygonatum* is said to be *Articulose*, or *Geniculated*.

ARUM; Wake Robin, or Cuckow Pint.

The Characters are;

The Leaves, which are intire, are long and triangular, and ear'd or darted at the Base; the Flower consists of one Leaf, is of an Anomalous Figure, or shap'd like an Ass's Ear; from the Bottom of the Flower rises the Pointal, accompanied with a great many Embryo's, each of which becomes a roundish Berry, containing one or two roundish Seeds.

This Plant is call'd *Wake Robin*, from the sharp acrid Taste, which, if eaten, will occasion a violent Pain in every Part of the Mouth and Throat, attended commonly with a great Defluxion of Water.

There are several Species of this Plant cultivated in the Gardens of the Curious, but there are not above two or three of them which are entertain'd for their Beauty or Scarceness, which are;

1. **ARUM**; *Africanum*, flore albo, odorato. Par. Bat. The African *Arum*, with white sweet-smelling Flowers.

2. **ARUM**; *esculentum*, *Sagittariae foliis viridi nigricantibus*. Sloan. Cat. Jam. The American eatable *Arum*, with Leaves like Spearwort.

3. **ARUM**; *maximum Aegyptiacum*, quod vulgo *Colocasia*. C. B. The Egyptian *Arum*, vulgarly call'd *Colocasia*.

The first of these *Arums* produce, in the Spring, large white Flowers, upon a Pedicle four or five Foot long, making a handsome Shew in a Collection of Plants. The Flowers have a faint sweet Scent, but continue a long time blowing.

This is propagated by parting the Roots, which are knobb'd in August, when the green Leaves are decay'd, and must be planted in Pots fill'd with good rich Earth, and hous'd in Winter with Oranges, &c.

The second and third Sorts are tenderer, and will not live thro' the Winter without a Stove; these produce large fair Leaves, but

have not produc'd any Flowers in England that I know of; the Roots of these two Sorts are quite of a different Nature from the other *Arums*, having a soft sweet Taste, somewhat resembling that of a *Hazel Nut*, and are very much eaten in *America*, as is also the last in *Egypt*.

These are propagated in the same manner as the first, but must be never expos'd to the open Air with us, which will soon deface their Leaves.

The common *Arum*, which is the Sort used in Physick, grows wild in most shady Banks near London; the best Season to gather their Roots for Use, is in July or August, when their green Leaves are decaying.

ARUNDO. The Reed.

The common *Reed* is so plentifully to be met with in the Marshes near the River of *Tbames*, that it will be needless to say any thing thereof, it being so well known to every one; but for the Sake of two other Sorts, I have inserted this Article, which are:

1. **ARUNDO**; *sativa*, quae *Donax Dioscoridis* & *Theophrasti*. C. B. The large manur'd Cane, or Reed.

2. **ARUNDO**; *Saccharifera*. C. B. The Sugar Cane.

The first of these is what is brought from Portugal and Spain, and is used to make Fishing Rods, and also by the Weavers.

This Plant, altho' a Native of a warm Country, yet will bear the Cold of our severest Winters in the open Ground; it dies to the Surface in Autumn, and rises again the succeeding Spring; and if kept supplied with Water in dry Weather, will grow ten or twelve Foot high the same Summer, and is very proper to intermix with small Trees and Shrubs, or tall Plants and Flowers in *Bosquettes*, where, by the Oddness of its Appearance, it will have a good Effect, in adding to the Variety: This is propagated by parting the Roots early in the Spring, before they begin to shoot, and will, in a year or two, if your Ground be good, make very large Stools; so that from each Clump, you may have twenty or thirty large Canes produced.

The *Sugar Cane* is very tender, and cannot be preserv'd without a Stove; it is kept as a great Curiosity in the Gardens of such as love a Variety of Plants, as being the Plant from whence the Sugar is produc'd.

It will grow with us to the Height of eight or nine Foot, if carefully look'd after, and may be propagated by taking off the Side Shoots in the Spring, planting them in Pots of good rich Earth, plunging the Pots into a Hot-bed of Tanners-Bark, to promote their taking fresh Roots, and must be often water'd: The main Stem is very subject to decay with us in Winter, but the Root commonly pushes out many new Shoots; if this happens, you must mind to clear the young Shoots from the dead Leaves of the old Stem, which will greatly strengthen them.

ASARUM;

ASARUM; [of a Privative, and *ασίω*, Gr. to adorn, as much as to say, a Plant fit for no Ornament.] *Afarabacca*.

The Characters are;

The Calyx (or Flower Cup) is divided into four Parts; the Fruit is divided into six Cells, which are fill'd with oblong Seeds; to which may be added, the Leaves are roundish, thick, and almost of the Colour of those of the Ivy Tree.

There are two Species of this Plant in the English Gardens, viz.

1. **ASARUM**. C. B. The common *Afarabacca*.

2. **ASARUM**; *Canadense*. Cornut. The *Canada Afarabacca*.

The first of these Sorts is very common, and hath been found wild in some Parts of England, tho' but rarely; it delights in a moist shady Place, and is increas'd by parting the Roots in Autumn: This is the Sort which is used in Medicine.

The *Canada* Sort is tolerably hardy, and will endure our common Winters in the open Ground, being rarely hurt but by great Rains, or planting it in a wet Soil. This is propagated as the other.

Both these Sorts preserve their green Leaves in Winter, which decay as their new ones are produc'd: Their Flowers appear in April, which grow so close to the Ground as not to be seen unless you put away the Leaves with your Hand: The first Sort produces ripe Seeds, but it is not worth the Trouble of sowing, it being two Years before these Plants will have any Strength, and they are much easier rais'd by Slips. The second very rarely produces good Seeds in England.

ASCLEPIAS, [is so call'd of *Æsculapius* the first Founder of Physick; and the Plant deservedly bears that Name, because of its excellent Virtues: It is also call'd *Vincetoxicum* of *Vincere*, to overcome, and *πικρά* Poisons, q. d. a Plant overcoming Poisons.] *Hirundinaria* or Swallow-wort.

The Characters are;

It hath a Flower consisting of one Leaf, which is divided into five Parts, expanded in Form of a Star: The Ovary becomes a Fruit, which is for the most part compos'd of two membranous Husks, which open from the Bottom to the Top, inclosing many Seeds, which are cover'd with a fine Down, and are fix'd to the Membrane, like as Scales are dispos'd upon the Skins of Fishes: This Plant hath no milky Juice, wherein it differs from the *Dogsbane*.

There are six different Varieties of this Plant preserv'd in the Gardens of the Curious, viz.

1. **ASCLEPIAS**; *albo flore*. C. B. The common Swallow-wort, with white Flowers.

2. **ASCLEPIAS**; *nigro flore*. C. B. The common Swallow-wort, with black Flowers.

3. **ASCLEPIAS**; *angustifolia, flore flavescente*.

H. R. Par. The narrow-leav'd Swallow-wort, with yellow Flowers.

4. **ASCLEPIAS**; *Africana, aizoides*. Tourn. The African Swallow-wort, commonly call'd, *Fritillaria Crassa*.

5. **ASCLEPIAS**; *Africana, aizoides, flore pulchrè fimbriato*. Com. Rar. The African Swallow-wort, with fair hairy Flowers, commonly call'd, *Fritillaria Crassa major*.

6. **ASCLEPIAS**; *Africana, aizoides, folio compresso digitato & cristato*. Boerb. Ind. The African Swallow-wort, with crested Leaves, commonly call'd, The Cockscorn *Fritillaria*.

The three first Sorts are very hardy, and will endure the Winter's Cold in the open Ground; the first Sort is sometimes used in Medicine, and is for that Purpose preserv'd in the Physick Gardens; they are all three of them propagated by parting their Roots, either in Spring or Autumn, and will grow in almost any sort of Soil; they may be also rais'd from Seeds, which must be sown early in the Spring, in a Bed of common Earth, and the second Year the young Plants will produce Flowers, but these rarely produce any Seeds in England.

The fourth, fifth and sixth Sorts, are Natives of the *Cape of Good Hope*, and were first brought from thence into the Dutch Gardens, and were afterwards brought into England; these Plants are propagated by planting Cuttings in any of the Summer Months, which Cuttings should be taken from the Plants, at least a Week before they are planted, and laid in a dry Place, that the Wound may be heal'd, and the Moisture evaporated, otherwise they are very subject to rot: these Cuttings must be planted in small Pots fill'd with a sandy Soil; and after having stood about a Week abroad in a shady Place, you may plunge the Pots into a very moderate Hot-bed, which will greatly forward their making new Roots; in about a Month's time after planting, you must begin to harden them, by exposing them to the open Air, but do not let them receive much Wet, which is a great Enemy to these Plants; and in the Beginning of September, you must house them with the smaller Sorts of *Aloes*, giving them very little Water in the Winter Season.

The fifth Sort is very subject to flower every Year, but the fourth and sixth Sorts flower but seldom; but neither of them is so apt to flower, if expos'd to the open Air in Summer; therefore it is the better way to let them remain in the House most part of the Year, giving them as much free Air as possible when the Weather will permit, and never letting them have much Water: With this Management all the Sorts will thrive much better, and oftener produce Flowers.

Although there is no great Beauty in these Flowers when blown, yet for their extreme Oddness they well deserve a Place in every curious Collection of Plants.

These Flowers so much resemble in Smell stinking Flesh, that the Flies will cover them with their Eggs, which come so far as just to have Life; but not finding proper Nourishment, they soon perish.

S

ASCYRUM;

ASCYRUM; [*Aescyrr*, of a Privative, and *αἰσῦρον*, Roughness, *q. d.* the smooth or bald Plant.] *S. Peter's-wort*.

The Character is;

This Plant differs from *St. John's-wort*, only in having a Pyramidal Seed Vessel, which is divided into five Cells.

We have only two Sorts of this Plant in England, viz.

1. **ASCYRUM**; *magno flore. C. B. P.* The large flowering *St. Peter's-wort*.

2. **ASCYRUM**; *Balearicum, frutescens, maximo flore luteo, foliis minoribus, subtus verrucosis. Salvador. Boerb. Ind. Myrto-Cistus Pennæ. Clus. H.* The large flowering *St. Peter's-wort* from *Majorca*, with small warted Leaves.

The first of these Plants was sent into England by Sir George Wheeler, to the Physick Garden at Oxford, from Constantinople, where he found it wild; this Plant produces very large Flowers, with a great Number of Stamina or Threads in the Middle, and makes a very agreeable Shew in the Wilderness Quarters, or in shady Borders, where it chiefly delights to grow: It is very hardy, and increases gently by its creeping Roots, which will soon overspread a Border; it is best when kept in small Tufts, and not suffer'd to run too much, which often prevents its flowering, by having too great a Quantity of Branches; the Flowers are produc'd in June and July, but it seldom perfects its Seeds with us. This will grow in almost any Soil.

The second Sort was first mention'd by Dr. Lobel, who receiv'd a dried Sample of this Plant from Dr. Pennæ, who found it in his Travels, and was by Lobel call'd *Myrto-Cistus*; the Flowers, as he thought, resembling the *Cistus* or *Rock Rose*, and the Leaves those of the *Myrtle*.

But this Plant was not known to any of the modern Botanists, until one *Salvadore*, an Apothecary, who liv'd at *Barcelona*, went into those Islands in search of Simples, where he found this Plant, and sending some Specimens thereof into England and Holland, which had some ripe Seeds in their Vessels, they were sown, and grew, from whence this Plant hath been spread into many curious Gardens.

This Plant is propagated, either from Seeds sown on a moderate Hot-bed in the Spring, or by planting Cuttings in the Summer Months in Pots of good Earth, which should be plung'd into an old Hot-bed, and kept water'd and shaded in the Heat of the Day, until they have taken Root, when you may by degrees expose it to the open Air, but it must be hous'd in Winter with *Myrtles*, *Amomum Plinii's*, &c. being too tender to endure the Cold of our Winters in the open Ground, but may, with a slight Shelter, be easily preserv'd. It requires frequent, but gentle Waterings, and loves a loose sandy Soil, with a small Mixture of very rotten Dung.

This is worthy of a Place in every curious Collection of Plants, for the Beauty of its red Shoots, small crisp'd Leaves, and its continuing to flower most part of the Year.

ASH-TREE; *vide Fraxinus.*

ASHES are esteem'd by some a good superficial Dressing of Corn and Meadow Land, as they give a new Ferment to such Lands as are in any Degree sluggish and unactive, and enrich those which are jejune and slow, being endow'd with singular Qualities to make them prolific.

All Sorts of *Ashes* do, indeed, contain in them a very rich fertile Salt, and are the best Manure of any to lay upon cold, wet Land, but then they ought to be kept dry, that the Rain may not wash away their Salt. Experience has shewn, that the *Ashes* of any Sort of Vegetable, are very advantageous to Land, by the Improvement that has been made in most Places in England, by burning Bean Stalks, Fern, Furze, Heath, Sedge, Straw, Stubble, &c.

Coal-Ashes, or such as are made of Newcastle, Scotch, and other Pit-Coal, are much recommended by some; but the first are most approv'd of, because they contain a greater Quantity of nitrous and sulphureous Matter than the others do, tho' the rest are good.

But these ought to be apply'd superficially, and not so near the Roots of Plants; and if so, there are few Plants but will receive Benefit by them, by their nitrous and sulphureous Qualities, being wash'd down by the Rain, which will open by the Strength of Water, and cause it to heave in some Degree, as Lime will do when Water is thrown upon it.

Wood-Ashes are commended as the Principal of superficial Dressings for Land, in that they contain a vegetative kind of Salt.

Kiln-Ashes, i. e. such as are made of Straw, Furze, &c. are by some accounted as good as any of the spirituous Improvements of Lands that are lightish; but for such as are heavy, they are look'd upon as scarce solid and ponderous enough. These *Ashes*, the Maltsters in the West-Country sift over their Corn and Grass. These are suppos'd, by their Heat, to cause a Fermentation, a Hollowness and Looseness in the Mould, by which means the Rains enter it the more easily, and dispose the Earth for giving up an Assumption of its vegetative Augment.

But these being light, ought never to be strew'd nor sifted in windy Weather, because they would be blown away; and if it can be so order'd as to be done just before Snow or Rain, it would be the better.

Soap-Ashes, (i. e. after the Soap-Boilers have done with them) are very proper for Lands that are very cold and sour, and to kill Weeds of all Sorts: And Sir Hugh Plat mentions one at Ware, who having a Piece of Land over-run with Broom and Furze, manur'd it with *Soap-ashes*, and had an incredible Crop of Wheat for six Years successively.

Pot-Ashes, after the Pot-ash Men have done with them, are esteem'd good for most Sorts of Land;

Land; but as they have been wet, and so most of the Salt drawn off by the Lee, they ought to be laid on much thicker than other Ashes.

Turf-Ashes are very good for all Sorts of Land, but especially for Clay-Lands; but will be much better if mix'd with Lime.

But all these *Ashes* ought to be kept dry from the Time they are made till they are used, for else the Rains will both wash away their Goodness, and also make them clod, especially some of the last-mention'd, so that they will not spread.

And besides, one Load of *Ashes* that have been kept dry, will go as far as two that have been expos'd to the Rain: And *Coal-Ashes*, if moisten'd with Chamber-lye or Soap-luds, will greatly add to their Strength.

All calcin'd Vegetables cause a fiery Heat and Vegetation, and when Wet comes, set the Ground to work, by a subtle Insinuation, unlocking the Clods, and quickening the Sluggishness of the Earth; according to that establish'd Maxim among Naturalists, *That all Fermentation is caus'd by the Interposition or Mixture of different Qualities one from the other.*

It is after this manner that *Coal-ashes* operate so admirably in loosening and mouldering stiff, clayey Grounds, and as it is usually term'd, making it rough, ashy or sandy-like: And, after the same manner, Sand mix'd with Clay does well, especially when it is impregnated with saline Qualities.

ASPARAGUS, the first Sprigs of Herbs before unfolded into Leaves; and the youngest and tenderest Branches that are eatable, are call'd *Asparagus*.

ASPARAGUS: [*Asparagus*, Gr. signifies a young Shoot putting forth. Sparagus or Sparage, corruptly call'd Sparrowgrais.

There are several Varieties of this Plant which are kept in the Botanick Gardens as Curiosities; but there is but one Sort which is chiefly cultivated in the Kitchen-Gardens, and is one of the greatest Dainties of the Spring. I shall therefore treat of this Kind only, and omit mentioning the other Kinds in this Place.

The Garden *Asparagus* is propagated by sowing of the Seeds; in the procuring of which, you should be particularly careful, since the Goodness of your future Crop, in a great measure depends thereon: You should therefore get it from some Person of Integrity, or if you have an Opportunity of saving it your self, or in some other neighbouring Garden: You must look over the *Asparagus* Beds in the Beginning of the Season, and mark some of the largest and fairest Buds with a Piece of Stick; which Buds, when they have branched out, may be fasten'd to a Stake thrust into the Ground to preserve it from breaking: These Buds will many of them produce great Numbers of red Berries, which should be suffer'd to remain upon the Branches

until the latter End of *September*, when the Haulm will begin to decay; then cut off the Branches, and strip the Berries into a Tub, where they may lie in a Heap to sweat for three Weeks, by which means the outter Husks will be rotten; then fill the Tub with Water, and with your Hands break all the Husks by squeezing them between your Hands: These Husks will all swim upon the Water, but the Seeds will sink to the Bottom; so that by pouring off the Water gently, the Husks will be carry'd along with it, and by putting fresh Water two or three times, and stirring your Seed about, you will make it intirely clean; then spread your Seed upon a Mat, and expose it to the Sun and Air in dry Weather until it is perfectly dry; when you may put it into a Bag, and hang it up in a dry Place till the Beginning of *February*; at which Time you must prepare a Bed of good rich Earth, whereon you must sow your Seeds, (but not too thick, which will cause your Plants to be small) and having trod your Seed into the Ground, rake it over smooth.

In the following Summer, keep it diligently clear'd from Weeds, which will greatly add to the Strength of your Plants; and toward the latter End of *October*, when the Haulm is quite wither'd, you may spread a little rotten Dung over the Surface of the Ground, about half an Inch thick, which will preserve the young Buds from being hurt with the Frosts, &c.

The Spring following, your Plants will be fit to plant out for good, (for I would never chuse Plants of more than one Year's Growth, having very often experienc'd them to take much better than older, and to produce finer Roots); you must therefore prepare your Ground by trenching it well, burying therein a good Quantity of rotten Dung at the Bottom of each Trench, so that it may lie at least six Inches below the Surface of the Ground; then level your whole Plot very exactly, taking out all large Stones: but this should not be done long before you intend to plant your *Asparagus*, in which you must be govern'd according to the Nature of your Soil or the Season; for if your Soil is dry, and the Season forward, you may plant early in *March*; but in a wet Soil, it is better to wait till the End of that Month, or the Beginning of *April*, which is about the Season that the Plants are beginning to shoot. I know many People have advis'd the planting of *Asparagus* at *Michaelmas*; but this I have experienc'd to be very wrong, for in two different Years I was obliged to transplant large Quantities at that Season, but I had better thrown away the Plants, for upon Examination, in the Spring, I found most of the roots were grown mouldy and decaying, and I am sure not one in five of them succeeded, and those which did, were so weak as not to be worth their standing.

The Season being now come, you must, with a narrow-prong'd Dung-fork, carefully fork up your Roots, shaking them out of the Earth, and separating them from each other, observing

observing to lay their Heads even for the more convenient planting them, which must be perform'd in this manner.

Your Plot of Ground being levell'd, you must begin at one Side thereof, ranging a Line very tight cross the Piece, by which you must throw out a Trench exactly streight, and about six Inches deep, into which you must lay your Roots, spreading them with your Fingers, and placing them upright against the Back of your Trench, so that the Buds may stand forward, and be about two Inches below the Surface of the Ground, and at twelve Inches Distance from each other; then with a Rake draw the Earth into the Trench again, laying it very level, which will preserve the Roots in their right Position: Then remove your Line a Foot farther back, and make another Trench in the like manner, laying therein your Plants, as before directed, and continuing the same Distance Row from Row, only observing between every four Rows to leave a Distance of two Feet four Inches for an Alley to go between the Beds to cut the *Asparagus*, &c.

Your Plot of Ground being finish'd and levell'd, you may sow thereon a small Crop of Onions, which will not hurt your *Asparagus*, and tread in your Seeds, raking your Ground level.

When your *Asparagus* is come up, (which will be in three Weeks or a Month after planting) you must with a small Hoe cut up all the Weeds, and thin your Crop of Onions where they may have come up in Bunches: But this must be done carefully, and in dry Weather, that the Weeds may die as fast as they are cut up. This Work must be repeated about three times; which if well done, and the Season not too wet, will keep the Ground clear from Weeds until the Onions are fit to be pull'd up, which is commonly *August*, and is known when their Greens fall down: When you have drawn off your Onions, you must clean your Ground well from Weeds, which will keep it clean till you earth the Beds; which must be done in *October*, when the Haulm begins to decay, for if you cut off the Haulm while green, the Roots will shoot fresh again, which will greatly weaken them: This young Haulm should be cut off with a Knife, leaving the Stems two or three Inches above Ground, which will be a Guide for you to distinguish the Beds from the Allies; then with a Hoe clear off all the Weeds into the Allies, and dig up the Allies, burying the Weeds in the Bottom, and throw the Earth upon the Beds, levelling it even, so that the Beds may be about five Inches above the Level of the Allies; then you may plant a Row of *Colworts* in the Middle of the Allies, but do not sow or plant any thing upon the Beds, which would greatly weaken your Roots; nor would I ever advise the planting of *Beans* in the Allies, (as is the Practice of many) for it greatly damages the two out-side Rows of *Asparagus*. In this manner it must remain till Spring, when you must hoe over the Beds to destroy

all young Weeds, and rake them smooth, and observe all the succeeding Summer to keep them clear from Weeds; and in *October* dig up the Allies again, as was before directed, earthing the Beds, &c.

The second Spring after planting, you may begin to cut some of your *Asparagus*; therefore now you must fork up your Beds with a flat Prong'd-fork made on purpose, and commonly call'd an *Asparagus-fork*: This must be done before the Buds shoot in the Spring, and with Care, not to fork too deep, so as to bruise the Head of the Root; then rake the Beds over smooth, just before the Buds appear above Ground, which will destroy all young Weeds, and keep your Beds clean a great while longer than if left unrak'd, or done so soon as fork'd; and when your Buds appear about four or five Inches above Ground, you may then cut them; but it should be done sparingly, only taking the large Buds, and suffering the small to run up to strengthen the Roots; for the more you cut, the more the Roots will produce, but they will be the smaller, and sooner decay. When you cut a Bud, you must open the Ground with your Knife, (which should be very narrow and long in the Blade, and filed with Teeth like a Saw) to see whether there are any more young Buds coming up close by it, which might be either broken or bruised in cutting the other; then with your Knife saw it off about two Inches under-ground. This may appear a very troublesome Affair to People unacquainted with the practical Part; but those who are employ'd in cutting *Asparagus*, will perform a great deal of this Work in a short Time; but the Care in doing it is absolutely necessary to be observ'd by all that cut *Asparagus*.

The manner of dressing your *Asparagus-Beds* is every Year the same as directed for the second, viz. keeping them clear from Weeds, digging the Allies in *October*, and forking the Beds towards the End of *March*, &c. only observe every other Year to lay a little rotten Dung (from a *Melon* or *Cucumber-Bed*) all over your Beds, burying some in the Allies also, at the Time for digging them up: This will preserve the Ground in Heart to maintain your Roots in Vigour; and by which Management a Plot of good *Asparagus* may be continued for ten or twelve Years in Cutting, and will produce good Buds.

The Quantity of Ground necessary to be planted with *Asparagus*, to supply a small Family, should be at least six Rods; less than that will not do, for if you cannot cut one hundred at a time, it will scarcely be worth while, for you must be oblig'd to keep it after it is cut two or three Days to furnish enough for one Mess; but for a larger Family, twelve Rods of Ground should be planted, which, if a good Crop, will furnish two or three hundred each Day in the Height of the Season.

But as there are several People who delight in having early *Asparagus*, which is become a very great Trade in the Kitchen-Gardens near *London*, so I shall give proper Directions

Directions for the obtaining it any time in Winter.

You must first be provided with a Quantity of good Roots (either of your own raising, or purchas'd from such Gardeners as plant for Sale) that have been two Years planted out from the Seed-bed; and having fix'd upon the Time when you would willingly have your *Asparagus* fit to cut, about six Weeks before, you should prepare a Quantity of new Stable Horse-dung, which shou'd be thrown in a Heap for a Week or more, to ferment; then dig out a Trench in the Ground where you intend to make the Bed, the Width of the Frames that are design'd to cover it, and the Length in proportion to the Quantity you intend to have, (which if design'd only to supply a small Family, three Lights at a time will be sufficient): Then lay down your Dung into the Trench, working it very regularly, and beat it down very tight with a Fork, laying it at least three Feet in Thickness; then put your Earth thereon about six Inches thick, breaking the Clods, and laying it level, and at one End begin laying your Roots against a little Ridge of Earth, rais'd about four Inches high: Your Roots must be laid as close as possible one to the other in Rows with their Buds standing upright: and between every Row lay a small Quantity of fine Mould, observing to keep the Crown of the Roots exactly level: When you have finish'd laying your Bed with Roots, you must lay some stiff Earth up to the Roots on the Out-sides of the Bed, which are bare, to keep them from drying, and thrust two or three sharp-pointed Sticks, about two Feet long, down between the Roots in the Middle of the Bed at a Distance from each other. The Use of these Sticks are to let you know what Temper of Heat your Bed is in, which you may find by drawing up the Sticks, and feeling the lower Part; and if after the Bed has been made a Week, you find it doth not heat, you may lay a little Straw or Litter round the Sides, or upon the Top, which will greatly help it; and if you find it very hot, it will be adviseable to let it remain wholly uncover'd, and to thrust a large Stick into the Dung on each Side of the Bed in several Places, to make Holes for the great Steam of the Bed to pass off, which in a short time will reduce the Bed to a moderate Heat.

After your Bed has been made a Fortnight, you must cover the Crowns of the Roots with fine Earth about two Inches thick; and when the Buds appear above Ground through that Earth, you must again lay on a fresh Parcel about three Inches thick; so that in the Whole it may be five Inches above the Crowns of the Roots, which will be sufficient.

Then you must make a Band of Straw (or long Litter) about four Inches thick, which you must fasten round the Sides of the Bed, so that the upper Part may be level with the Surface of the Ground: This must be fasten'd with straight Sticks about two Feet long, sharpen'd at the Points to run into the Bed,

and upon this Band you must set your Frames, and put your Glasses thereon; but if after your Bed hath been made three Weeks, you find the Heat decline, you must lay a good Lining of fresh hot Dung round the Sides of the Bed, which will add a fresh Heat thereto; and in bad Weather, as also every Night, keep the Glasses cover'd with Mats and Straw, but in the Day-time let it be all taken off, especially whenever the Sun appears, which shining through the Glasses will give a good Colour to the *Asparagus*.

A Bed thus made, if it works kindly, will begin to produce Buds for cutting in about five Weeks, and will hold about three Weeks in cutting, which, if rightly planted with good Roots, will produce in that time about three hundred Buds in each Light; so that if you would continue your *Asparagus* until the Season of the Natural being produc'd, you must make a fresh Bed every three Weeks, until the Beginning of *March*, from the Season of your first Bed being made; for if your last Bed is made about a Week in *March*, it will last till the Season of natural *Asparagus*, and the last Beds will come a Fortnight sooner to cut than those made about *Christmas*, and the Buds will be larger and better colour'd, as they enjoy a greater Share of the Sun.

If you intend to follow this Method of forcing early *Asparagus*, you must keep planting every Year a Quantity which you shall judge necessary, (unless you intend to buy it from some other Garden): The Quantity of Roots necessary to plant one Light, is commonly known by the Measure of the Ground where they grew, for in a good Crop, where few Roots are missing, one Rod of Ground will furnish enough for a Light: But those who plant *Asparagus*, with a Design to take it up for Forcing at two Years end, make six Rows in each Bed, at ten Inches Distance only, and lay the Plants in the Rows about eight Inches asunder, which will be a sufficient Distance, as they are design'd to remain but two Years. The best Ground for planting *Asparagus* to have large Roots for Hot-beds, is a low moist rich Soil; but for those that are to remain for a natural Produce, a middling Soil, neither too wet nor too dry; but a fresh sandy Loam, when well dung'd, is preferable to any other.

ASPEN-Tree; *vide* Populus.

ASPERIFOLIOUS Plants [*Asperifolius*, of *Asper* rough, and *Folium*, Lat. a Leaf] are such Plants as are rough-leav'd, having their Leaves plac'd alternately, or without any certain Order on their Stalks; they have a monopetalous Flower cut or divided into five; after every Flower there succeeds commonly four Seeds, such as *Bugloss*, *Borage*, *Comfrey*, *Hound's-Tongue*, &c.

ASPERULA; Woodroof.

This Plant grows wild in shady Woods in many Parts of England, and flowers in *April* and *May*, and is sometimes used in Medicine.

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ASPHO-

ASPHODELUS, [*Ἀσφodelos* of *ασφodelos*, Gr. firm, and by *Pliny* it is call'd *Hastula*, or *Baccillus Regius*, because when it flowers the Stalk resembles a Royal Scepter; it is the same Herb which is call'd also *Antiricon*, with which, as *Lucian* feigns, the Manes or Ghosts are fed in *Pluto's* Dominions.] *Kingspear*.

The Characters are;

The Stalk is round, smooth, strong, and branchy; the Leaves are like those of a Leek, but stronger and narrower; the Flowers are divided commonly as far as the Basis, naked, stellated, embracing the Ovary like a Calix: the Apex of the Ovary puts forth six Stamina and a long Tube from the Center, which becomes a roundish Fruit, carnos, triangular, divided into three Partitions, in which are inclos'd triangular Seeds.

There are three or four Varieties of this Plant which are well worth preserving in all curious Flower-Gardens, viz.

1. **ASPHODELUS**, *luteus* & *flore* & *radice*. C. B. The yellow *Asphodel* or *Kingspear*.

2. **ASPHODELUS**, *albus*, *ramosus* mas. C. B. The great white branching *Asphodel* or *Kingspear*.

3. **ASPHODELUS**, *albus*, *non ramosus*. C. B. The white unbranched *Asphodel* or *Kingspear*.

4. **ASPHODELUS**, *Allobrogicus*, *magno flore* *Lili*. H. L. The large flowering Savoy *Asphodel* or *Kingspear*.

These Plants are all of them extreme hardy, and will prosper in almost any Soil that is not too stiff or wet, which is subject to rot the Roots in Winter: The Way to increase them is, by parting their Roots in August, before they shoot up their fresh green Leaves. These Plants growing pretty tall, are proper for large Borders, or to mix with Flowers of large Growth, in small Quarters or Bosquets in Wilderness-work, but must not be planted in Borders of small Flowers, where, by their large spreading Roots, they would destroy their weaker neighbouring Plants.

The yellow Sort multiplies very fast by Roots, and will soon overspread a large Border, if suffer'd to remain unremov'd, or the Side-Roots are not taken off: But the other Sorts are not so productive of Shoots from their Sides, and are much better kept within Bounds. They may all be rais'd from Seeds, which should be sown in August; and the August following, may be transplanted out into Nursery-beds or Borders, and will produce Flowers the second Year. The yellow and large-branch'd *Asphodels* are sometimes used in Medicine.

ASPLENIUM or *Ceterach*, [is so call'd of *Splen* the Spleen, because good against Diseases of the Spleen: It is also call'd *Scolopendria*, because the Leaves of this Plant, by their Figure, resemble the Body and Feet of this Animal. The Name *Ceterach* is *Arabick*.] *Spleenwort* or *Miltwastie*.

The Characters are;

The Leaves are like those of the Polypody, but less, and pretty round, notched toward the Side, downy, having a squamous Dust, in which, by the Help of a Microscope, membranous [Capsulæ] or Seed-pods lying close to one another, are perceiv'd, every one furnished with a little round Rope, which by its Construction opening the Fruit into two Parts, pours forth certain very small Seeds; the Root is fibrous. This Plant thrives in stony Places, as in Walls, &c.

This Plant is of the Fern-kind, and grows upon old moist shady Walls in divers Parts of England.

ASTER, [*ἄστρον*, Gr. a Star, so call'd, because the Flower is radiated with little Leaves after the manner of a Star, according to *Dioscorides*. It is also call'd *Helenium* of *Ἑλένη* the Sun, or, as others say, of *Helena* the Daughter-in-Law of *Priamus*.] *Starwort*.

The Characters are;

It hath a fibrose Root, the Leaves are for the most part intire, and are plac'd alternately on the Branches; the Stalks are branch'd; the Flowers are radiated, specious, and have a scaly Cup: the Seeds are included in a downy Substance.

There is a great Variety of these Plants which are preserv'd in Botanick Gardens, from which I shall only select some of the most beautiful, as very proper Ornaments in Borders of large Gardens, when few other Flowers are in Beauty.

1. **ASTER**, *Atticus*, *caruleus*, *vulgaris*. C. B. The Italian blue *Starwort*.

2. **ASTER**, *Pyrenaicus*, *præcox*, *flore caruleo majore*. Dod. The early Pyrenian *Starwort*, with large blue Flowers.

3. **ASTER**, *Nova Angliæ*, *altissimus hirsutus*, *floribus maximis purpureo-violaceis*. Par. Bar. Prod. The tall rough New-England *Starwort*, with large purple Flowers.

4. **ASTER**, *Nova Angliæ*, *latifolius*, *paniculatus*, *floribus saturate violaceis*. H. L. The broad-leav'd panicled New-England *Starwort*, with deep violet-colour'd Flowers.

5. **ASTER**, *Nova Angliæ*, *umbellatus*, *floribus dilute violaceis*. H. L. New-England *Starwort*, with pale violet-colour'd Flowers growing in an Umbel.

6. **ASTER**, *Virginianus*, *serotinus*, *parvo albente flore*. Park. The late flowering Virginian *Starwort*, with small whitish Flowers.

7. **ASTER**, *caruleus*, *serotinus*, *fruticescens*, *Tradescanti*. Rasi Hist. Tradescant's shrubby late-flowering blue *Starwort*.

8. **ASTER**, *Tripolii flore*. C. B. Narrow-leav'd *Starwort*, with Flowers like *Tripolum*.

9. **ASTER**, *Virginianus*, *pyramidalis*, *Hyssopifolius*, *asperis*, *calycis squamulis foliaceis*. Rand. The Virginian *Starwort*, with Leaves like *Hyssop*, and large blue Flowers with scaly Cups.

The first, second, eighth, and ninth Sorts are much preferable to the rest for small Gardens,

Gardens, being not so apt to spread at the Root as are the others, and grow much lower, are less subject to shed their Seeds, and, with a small Support, may be kept upright in a regular Shape. The second Sort is the first in flower; it grows about two Foot high, and produces large purple Flowers, but seldom in such large Tufts as the first, nor are the Flowers so beautiful; however, as it comes to flower much sooner, it deserves a Place in every good Garden: This Sort is succeeded in flower by the Eighth, which is of shorter Growth, seldom rising above a Foot in Height: The Flowers are much smaller, but are produc'd in very large Clusters, so as to make a very agreeable Shew.

The first Sort succeeds these, and is one of the most beautiful Kinds; it grows seldom more than two Foot high, and is easily kept in Compass; the Flowers are large, produc'd in great Tufts, and are of a fine blue Colour, with a yellow Thrum in the Middle, and is a great Ornament to Gardens in its Season of Flowering. This is the *Amellus* of *Virgil*.

The third, fourth, and fifth Sorts, grow to the Height of four or five Foot, and produce large Quantities of Flowers, and are very proper for large Gardens, where they may have Room, but in small Places they are very apt to over-run whatever is planted near them, and the Seeds are subject to shatter and fill the Garden with young Plants, if the Stalks are not cut down and carried away soon after the Flowers are past; for which Reasons few People care to keep them, but yet in large Wildernesses they are very good to fill up Vacancies, and the Flowers are very proper to adorn Halls and Chimnies, and as they come at a Season when few better Flowers appear, are the more valuable: But in order to keep them within Bounds, you should at least once a Year dig round them, and cut off all the spreading Roots, which would otherwise extend themselves very far, and become unsightly, and with these Roots you may make fresh Plantations. These come at a middle Season to flower.

The sixth, seventh, and ninth Sorts are very late Flowerers, seldom appearing till *October*, and do in a good Season hold till the Middle of *November*; for which Reason they are much esteem'd.

The seventh Sort grows to a great Height, and is very proper to intermix with other large Kinds; but it is not so subject to creep at the Root as they are, and the Flowers are large, growing in handsom Tufts.

The sixth Sort flowers very late, but they are very small, and grow sparsely on the Branches; for which Reason it is not so valuable as the other. But the ninth Sort is one of the most beautiful; the Flowers are large, and of a deep blue Colour; the whole Plant grows erect, and never creeps at the Root: It begins to flower toward the End of *September*, and continues till the Middle of *November*, and makes a very good Shew during that Season.

All the Sorts of *Starworts* are propagated by

parting their Roots early in the Spring, and will grow in almost any Soil or Situation; the larger Sorts increase so fast, that in a short time they will run over a large Spot of Ground, if not prevented: These grow best in the Shade; the lower Kinds seldom creep at the Root, but must be taken up and planted every other Year, which will cause their Flowers to be the fairer. The ninth Sort may be increas'd by planting Cuttings of it in any of the Spring Months, which will flower the first Year: The Roots of this increasing but slowly, this is the only Method to get a Stock of this Plant. This Plant, if set in Pots and shelter'd in bad Weather, will continue flowering most part of the Winter, but dies to the Surface in the Spring, as doth all the Sorts of *Starworts*.

ASTERISCUS; [of *After* or *Starwort*, which it is very like, except that the Seeds are not Pappous, but Channell'd.] Yellow *Starwort*.

The Cup of the Flower being stellated with little Leaves, which are extended beyond the Petals of the Flower in Length.

This Plant having no *English* Name, I have call'd it *Yellow Starwort*, altho' it is very different in its *Characters* from that Plant; the Seeds of this being plain, and for the most part border'd round the Edges, having no Down adhering to them, and the Flowers being surrounded with a *Foliaceous Calyx*.

There are several *Species* of this Plant cultivated in the curious Botanick Gardens, but in *England* we have but three Sorts, which are preserv'd for their Beauty; viz.

1. **ASTERISCUS**; *annuus, foliis ad florem rigidis*. *Tourn.* The annual *Asteriscus*, with stiff Leaves and Flowers.

2. **ASTERISCUS**; *annuus, Lusitanicus, odoratus*. *Boerh.* The Portugal sweet-smelling annual *Asteriscus*.

3. **ASTERISCUS**; *maritimus perennis patulus*. *Tourn.* The maritime Perennial dwarf *Asteriscus*.

The two first Sorts being Annuals, must be sown in good Ground, and a warm open Situation, early in the Spring, in the Places where they are to remain, for they do not care for transplanting.

These produce their Flowers in *August*, and if the Autumn is dry and warm, will perfect their Seeds in *September*, but in bad Years they often miscarry.

The third Sort is propagated either from Seeds, or by planting Cuttings in any of the Summer Months; it is an abiding Plant, and continues flowering the greatest Part of the Year, for which it is valued: This is tender, requiring a little Shelter in very hard Weather.

ASTRAGALUS; Wild Liquorice, or Liquorice Vetch.

There are many *Species* of this Plant cultivated in the Botanick Gardens; but as they are seldom propagated in Gardens for Use

Use or Beauty, I shall pass them over in this Place.

ASTRANTIA; Masterwort.

ATMOSPHERE; [*Ἀτμόσφαιρα* of *Ἄτμος* a Vapour, and *σφαῖρα*, Gr. a Sphere] is an Appendage of the Earth, which consists of a thin, fluid, elastick Substance, call'd *Air*, surrounding the Terraqueous Globe to a considerable Height.

The whole Mass or Assemblage of ambient Air, is commonly understood to be the *Atmosphere*.

But the more accurate Writers restrain the Term *Atmosphere* to that Part of the Air which is next to the Earth, which receives the Vapours and Exhalations, and which is terminated by the Refraction of the Light of the Sun.

Those Spaces that are higher, and beyond these, are call'd *Æther*; and being suppos'd to be possess'd by a finer Substance, are call'd the *Ætherial Regions*, tho' these perhaps are not destitute of Air.

This *Atmosphere* insinuates it self into all the Vacuities of Bodies, and by that means becomes the great Spring of most of the Mutations here below, as Generation, Corruption, Dissolution of Vegetables, &c. To the Pressure of the *Atmosphere* Plants owe their Vegetation, as well as Animals do their Respiration, Circulation, and Nutrition. See *Æther* and *Air*.

Dr. Halley found, by undoubted Experiments, that the Weight of *Mercury* to *Water*, is as $13 \frac{1}{2}$ to 1, or very near it; and that the Specifick Weight of *Air* to *Water*, is as 1 to 800; so that the Weight of *Mercury* to *Air*, is as 10800 to 1; and a Cylinder of *Air* of 10800 Inches, or 900 Feet, is equal to an Inch of *Mercury*: so that if the *Air* was of an equal Density like *Water*, the whole *Atmosphere* would be no more than $5 \frac{1}{10}$ Miles high, and in the Ascent of every 900 Feet, the *Barometer* would sink an Inch; but the Expansion of the *Air* increasing in the same Proportion, as the incumbent Weight of the *Atmosphere* decreases; that is, as the *Mercury* in the *Barometer* sinks, the upper Parts of the *Air* are much more rarefied; and each Space answering to an Inch of *Quicksilver*, grows greater and greater, so that the *Atmosphere* must be extended to a much greater Height.

Upon these and such like Suppositions, it will appear, that at the Height of 45 Miles, the *Air* is so rarefied, as to take up 3000 times the Space it occupies here; and at 53 Miles high it would be expanded above 300000 times: But it is probable, that the utmost Power of its Spring cannot exert it self to so great an Extension, and that no Part of the *Atmosphere* reaches above 45 Miles from the Surface of the Earth.

ATRACTYLIS; Distaff-Thistle.

ATRIPLEX; Arach, or Orach.

This Plant is sometimes cultivated in Gardens as a Culinary Herb, being used as Spinage, and is by some prefer'd to it, but there

are very few in *England* that are fond of it. This may be sown in the Spring as Spinage, and must be eaten young, for when it is run up to Seed, it is very strong: This Plant, if suffer'd to shatter its Seeds in a Garden, will become a lasting Inhabitant, the Seeds often remaining several Years in the Ground, and every time the Ground is dug, will send forth many of the Plants.

AVENUES, are Walks or Entrances leading to a Place, and in Gardening, are Walks planted with Rows of Trees, made in the Front-end of the Garden, leading to the Front of an House, or to a Garden Gate, to a Highway Gate or Wood, to terminate in a Prospect.

As to such *Avenues* that lead to an House, they ought to be as wide as the whole breadth of the Front, and if they be wider they are better.

And as for such *Avenues* to Woods or Prospects, &c. they ought not to be less than sixty Foot in Breadth; and because such Walks are a long time before they are shady, it will be convenient to plant another Row on each Side, rather than to lose the Stateliness that the main Walk will afford in Time by being broad, where any thing of a Prospect is to be gained.

And as to the Distance one from another, they should not be planted nearer to one another than thirty-five or forty Feet, especially if the Trees are any thing of a spreading Kind; and the same Distance if they are for a regular Grove.

As to the Trees proper for planting *Avenues*, they may be the *English Elm*, the *Lime Tree*, the *Horse Chestnut*, the *Common Chestnut*, the *Beach*, and the *Abele*.

The *English Elm* is approv'd for all Places where it will succeed, and that it will do in most Places, except in very wet or cold shallow Grounds. 1. Because it will bear cutting, heading, lopping in any manner whatsoever, and probably with better Success than any other Tree.

Others approve of the *Dutch Elm*, rough or smooth; the broad-leav'd or *Witch Elm*, because they are of quicker Growth than the *English*, and will grow tolerably well in almost any Soil: It will also remove very well, and seldom miscarries if but an ordinary Care be taken of it, which the *English Elm* is subject to do. 2. Because it is out with green Leaves in the Spring, with the earliest Plants, and continues its Beauty as long as almost any other Tree. 3. Because it makes an incomparable Hedge, and is preferable to all others for lofty *Espaliers*.

Secondly, The *Lime Tree*; This is approv'd by others, because it will do well in any tolerable Soil, if the Bottom be not wet and cold, and because of the regular Shape it has in growing, the Agreeableness of its Shade, and the beautiful Colour of its Leaves.

Thirdly, The *Horse Chestnut* is recommended to be used every where in such Places as are very well defended from strong Winds; because where-ever it grows freely, if it be not skilfully

skilfully manag'd now and then by cutting the Branches are subject to split down: This Tree is valuable on account of its quick Growth, the Earliness of its coming out, the Nobleness of its Leaves, and the Beauty of its Flowers, being a fine Plant both for Shade and Ornament. This delights in a strong, hearty Soil, but will do well in any tolerable Soil, if good Care be taken in the Planting of it.

Fourthly, The *common Chestnut* will do well in a proper Soil, and will rise to a considerable Height if planted close together, but if it be planted singly, where the Tree can take its own natural Shape, it is rather inclin'd to spread and grow globous than tall.

Fifthly, the *Beech* is recommended by some, but this seldom succeeds well after transplanting, without extraordinary Care, tho' it arrives to a very large Tree in many Places in *England* where it grows naturally, and is the most tedious and troublesome to raise to any tolerable Size in a Nursery Way.

Sixthly, the *Abele*. This indeed grows more dispers'd and loose in its Head than any of the former, and consequently is worse for Defence; but yet yet is not to be left out from the Number of Trees for *Avenues*, because it is the quickest in Growth of all the Forest Trees, and will thrive tolerably well in almost any Soil, and particularly in wet Ground where few of the before-mention'd Trees will thrive: And this seldom fails in transplanting.

Seventhly, The *Oak*; but this is seldom used in planting *Avenues*, because it requires so long a time to raise it up to any tolerable Stature in the Nursery Way; nor is it apt to thrive much after it has been transplanted if at any Bigness.

As for the *Alder*, *Ab*, *Platanus*, and *Sycamore*, they are but rarely used for planting *Avenues*.

AUGUST.

The Beginning of this Month sow *Onions*, *Spinage*, *Corn-Sallet*, and *Chervil*, to stand the Winter, as also some *Cabbages* of the early kind, *Silesia*, *Brown Dutch* and *Imperial Lettuce*, for an early Crop next Spring; you may now sow several Sorts of Seeds which lie long in the Ground, which, if sown in the Spring, seldom grow well, or are apt to remain till the second Year before they appear, as *Angelica*, *Lovage*, *Scurvy-Grass*, *Masterwort*, &c.

The tenth Day of this Month sow your first Crop of *Cauliflowers*, and repeat the same the fifteenth Day for the second Crop; you may still sow *Turnips* for a latter Crop, until the twenty-fourth Day, those sown later seldom come to good.

If the Season proves moist in this Month, you may transplant *Endive* for a late Crop, and cut off the flowering Branches of *Aromatick Herbs*, as *Lavender*, *Thyme*, *Rosemary*, *Savoury*, and *Hyssop*, that they may make new Shoots before Winter; but do not perform this Work in dry Weather, which will greatly endanger your Herbs.

Look carefully over your Fruit-Walls for Snails and other Vermin, which will greatly annoy your Fruit, if not timely prevented; and nail in such Shoots as project from the Wall, that your Fruit may have the Advantage of the Sun to ripen them, but do not cut or pull off the Leaves of the Tree, for this greatly injures your Fruit, as will be shewn in a proper Place.

In dry Weather earth up *Celery*, and tie up *Endive* for Blanching; pull up *Onions* and *Garlick* as their Blades begin to wither and fall, and clear your Ground from Weeds.

Untie the Buds of Fruit-Trees which were inoculated the last Month, and cut off Suckers from the Stocks of Fruit-Trees; and toward the End of the Month hoe and clean young *Spinage* and *Lettuce*, &c. which were sown the End of the last Month, or the Beginning of this; but observe to do it in dry Weather, that the Weeds may decay the sooner.

Gather in all Sorts of Kitchen Garden Seeds that are now ripe, in dry Weather, spreading them on Mats in a dry Place, exposing them to the Sun at all Opportunities, till they are fit to rub or beat out of the Husks.

Observe to keep the Roots of your *Melons* from too much Wet, which often decays the Vines before the Fruit is ripe.

In the Flower and Green-House Garden:

Transplant the Layers of your *Carnations*, which by this time will have sufficient Roots, if timely layed; shift your Pots of *Auricula's*, and transplant *Polyanthus's*; remove the Bulbs of *Iris's*, *Narcissus's*, *Fritillaria*, and *Hyacinths* of *Peru*, as also such *Tuberose* and *Squamosa* rooted Flowers as begin now to decay, and will soon push out fresh Roots, after which time they suffer by Removing, as *Lilies*, *Martagons*, *Crown Imperials*, *Pæonia's*, *Flag Iris's*, &c.

About the Beginning of this Month inoculate *Orange* Trees, placing them with their Buds from the Sun, and cut off *Oranges*, *Jessamines*, and other inarch'd Stocks from the Mother Trees, being careful in the Operation not to break off the new-grafted Branch; but let the Clay remain upon it until the next Spring.

Sow the Seeds of *Anemonies*, *Pulsatilla's*, *Ranunculus's*, *Crocus's*, *Fritillaria's*, *Hyacinths*, *Tulips*, *Narcissus's*, *Cyclamens*, &c. in Pots or Boxes, placing them where they may receive the Morning Sun till Eleven of the Clock, and keep them gently moisten'd in dry Weather; cut down the wither'd Stalks of such Flowers as have done blowing, and fasten to strong Stakes, all large flowering Plants which are yet to blossom, lest the strong Winds break them down and prevent their flowering.

Gather all such Flower Seeds as are now ripe in dry Weather, before they are shed upon the Ground, and keep your Pots of annual Plants supplied with Water, that they may perfect their Seeds; and toward the latter End of the Month, remove such of them as are tender, and have not brought their Seeds to Maturity into the Green-house, lest, by letting them

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remain

remain in the open Air, their Seeds should prove naught.

The Beginning of this Month is the proper Season for shifting and transplanting your Aloes, Ficoides, Sedums, and any other of your Stove or Green-house Plants, which were not remov'd in the preceding Months, observing to shade them from the great Heat of the Sun till they have taken fresh Root.

Toward the latter End of the Month, house such of your tender Exoticks as were set Abroad; for the Evenings now begin to grow cold, and great Rains many times fall at this Season, which are very injurious to succulent Plants.

Fruits in Prime, or yet lasting.

Of Apples; The Juniting, Summer white Caustin, Codlin, Summer Pearmain, Margaret.

Of Pears; Summer Bergamot, Blanquette, Jargonelle, Summer Boncretien, Poire sans peau; or, the Skinless Pear, Cassiolette, Windsor, Cuisse Madam, Hamden's Bergamot, Caliorossatt, and Summer Mouille bouche.

Of Peaches; Red and White Magdalen, Smith's (or early) Newington, Bellows or Bellis, Violette hative, Passe Violet, Purple Alberge, Early Admirable, Albemarle, Nivet, Nobless, Pavie Royal, Troy Peach, Old Newington and George Peaches.

Of Nectarines; Roman, Temples, Elruge, Newington, Golden, Brugnion, Italian, and Murray.

Of Plumbs; The White and Blue Perdri-gon, the Violet, Le Royal, Drap d'or, S. Catherine, Rochecourbon, Reine Claude, Green Gage, Queen Mother, Bonum Magnum, Maitre Claude, Imperial, Royal Dauphin.

Of Grapes; July, White and Red Sweet-water, Cluster, Burgundy, Chasselas, White Muscadine, Orleans, &c.

Of Figs; The Early White, Common White, Long Blue, Round Blue, Italian White, and Brunswick.

Filberts, Mulberries, Melons, Ananas or Pine Apples, &c.

Flowers in Prime, or yet lasting.

Annual Stocks, some Carnations; Painted Lady, and Old Man's-head Pinks, some Auricula's; Female Balsamine, Marvel of Peru, Amaranthus's, several Sorts; Amaranthoides, Sun-flowers of many Kinds; Starworts, Golden Rods, Chrysanthemums, Cardinal Flower, Campanula, Hollyhucks, Geraniums, Colchium Chio, Cyclamens, Ficoides's, Indian Figs, Oleanders, Oranges, Jessamines, Passion Flowers, Tuberoses, Myrtles, Colutea Aethiopica, Scorpion Sena, Nasturtium Indicum, Convolvulus's, Lavatera, African and French Marygold's, Nigella, Candy Tuft, Venus Looking-Glass, Flos Adonis, Sweet Pease, Ever-lasting Pease, Sweet Sultan, Scabious's, Althaea Frutex, Tree Mallow, Apocynums, Virgins Bower, Fritillaria Crassa, several Sorts of Aloes, Sedums, Coryledons, Guernsey and Belladonna Lilies.

AURANTIUM; [this Plant is call'd of Aurum, Lat. Gold, on account of its Golden

Colour; or, as others suppose, of the Province of Orange.] The Orange-Tree.

The Characters are;

The Leaves have two Lobes or Appendages at their Base, which are like Ears, and cut in Form of a Heart; the Fruit is round and depress'd, and of a yellow Colour when ripe; the Juice is sweet, in which it differs from the Citron and Lemon.

There are a very great Variety of this Tree preserv'd in the Gardens of the Curious; to enumerate them all would be too tedious in this Place, I shall therefore only mention the best known Sorts, and proceed to their Culture.

1. AURANTIUM; acris medullâ, vulgare. Ferr. Hesp. The common Sevil Orange.

2. AURANTIUM; medullâ dulci vulgare. Ferr. Hesp. The sweet Sevil Orange.

3. AURANTIUM; Sinense. Ferr. Hesp. The China Orange.

4. AURANTIUM; Crispo folio. Ferr. Hesp. The curl'd-leav'd Orange.

5. AURANTIUM; Crispo folio, elegantissime variegato. Boerb. Ind. The strip'd curl'd-leav'd Orange.

6. AURANTIUM; Corniculatum. Ferr. Hesp. The horn'd Orange.

7. AURANTIUM; folio variegato, vulgare, Anglicum dictum. Boerb. Ind. The common strip'd Orange.

8. AURANTIUM; Hermaphroditum, partim Aurantium, partim Citrium. The Hermaphrodite Orange.

9. AURANTIUM; angusto Salicis folio dictum. Boerb. Ind. The willow-leav'd Orange, commonly call'd, The Turkey Orange.

10. AURANTIUM; angusto salicis folio elegantissime variegato. The strip'd Turkey Orange.

11. AURANTIUM; fructu maximo, India Orientalis. Boerb. Ind. The Pumpelmocs; or Shaddock.

12. AURANTIUM; flore duplici. The double flower'd Orange.

13. AURANTIUM; fructu minimo. The Nutmeg; or, Dwarf Orange.

14. AURANTIUM; fructu minimo, foliis ex albo variegatis. The strip'd Nutmeg; or, Dwarf Orange.

There are also a great Variety of Oranges with strip'd Leaves, to be found in the curious Collections of these Trees, which differ in the Colour or Manner of the Stripes or Blotches; but these I shall pass over, and proceed first to the Manner of raising them from Seed.

If you purpose to raise Stocks for budding of Oranges, you should procure some Citron-Seeds which were duly ripen'd; for the Stocks of this Kind are preferable to any other, both for Quickness of Growth, as also that they will take Buds of either Orange, Lemon, or Citron: The best Seeds are usually to be had from rotten Fruits, which are commonly easy to be procur'd in the Spring of the Year: Then prepare a good Hot-bed of either Horse-dung or Tanners-bark, the last of which is by much the better, if you can easily procure it: When this Bed is in a moderate Temper for Heat,

Heat, you must sow your Seeds in Pots of good rich Earth, and plunge them into the Hot-bed, observing to give them Water frequently, and shade the Glasses with Mats in the great Heat of the Day; and raising the Glasses to give proper Air, lest the Seeds should suffer by too great Heat: In three Weeks-time your Seeds will come up; and if the young Plants are not stunted, either for want of proper Heat or Moisture, they will be in a Month's-time after their Appearance, fit to transplant into single Pots; you must therefore renew your Hot-bed; and having prepar'd a Quantity of small Half-penny Pots, (which are about five Inches over at the Top) fill this half full of good fresh Earth, mix'd with very rotten Cow-dung; and then shake out the young Plants from the large Pots, with all the Earth about them, that you may the better separate the Plants without tearing their Roots; and having put a single Plant into each of the small Pots, fill them up with the same Earth as before directed, plunging the Pots into the new Hot-bed, giving them a good Watering to fix the Earth to their Roots, and observe to repeat the same very often, (for this Plant, when in a Hot-bed, requires much Water) and be sure to screen them from the Sun in the Heat of the Day: In this Method, with due Care, your Plants will grow to be two Feet high by July, when you must begin to harden them by degrees, in raising your Glasses very high; and when the Weather is good, take them quite off, but do not expose them to the open Sun in the Heat of the Day, which would be very injurious to them, especially while young: Toward the End of September you must house them, observing to place them near the Windows of the Green-house, to prevent the Damps from moulding their tender Shoots: During the Winter-Season they may be often refresh'd with Water, but it must be done sparingly, giving them but a little each time; and in March or April, wash their Heads and Stems, to clear them from the Filth that may have settled thereon during their being in the House; and you must also give them a gentle Hot-bed in the Spring, which will greatly forward them, but harden them by the Beginning of June, that they may be in right Order to bud in August, when you should make Choice of Cuttings from Trees that are healthy and fruitful, of whatever Kinds you please, observing that the Shoots are round, the Buds of these being much better and easier to part from the Wood than such as are flat: When you have budded the Stocks, you should remove them into a Green-house to defend them from Wet, turning the Buds from the Sun, but let them have as much free Air as possible, and refresh them often with Water: In a Month's-time after budding, you will see which of them has taken; you must then untie them, that the Binding may not pinch their Buds, and let them remain in the Green-house all the Winter, and in the Spring prepare a moderate Hot-bed of Tanners-bark; and after having cut off the

Stocks about three Inches above the Buds, plunge their Pots into the Hot-bed, observing to give them Air and Water, as the Heat of the Weather shall require; but be sure to screen them from the violent Heat of the Sun during the Heat of the Day: In this Management, if your Buds shoot kindly, they will grow to the Height of three Feet by July; at which time you must begin to harden them before the cold Weather comes on, that they may the better stand in the Green-house the following Winter: And as this will be a sufficient Height for the Stems, you may stop the leading Shoot, in order to force out lateral Branches: In the first Winter after their shooting you must keep them very warm, for by forcing them in the Bark-bed, they will be somewhat tenderer, but it is very necessary to raise them to their Height in one Season, that their Stems may be strait: for in such Trees which are two or more Years growing to their heading Height, the Stems are always crooked: In the succeeding Years, their Management will be the same as in full-grown Trees, which will be hereafter treated of; I shall therefore now proceed to treat of the Management of such Trees as are brought over every Year in Chests from Italy; which is, indeed, by much the quicker Way of furnishing a Green-house with large Trees, for those which are rais'd from Seeds in England, will not grow so large in their Stems under ten or twelve Years as these will have when brought over; and although their Heads are small when we receive them, yet in three Years, with good Management, they will obtain large Heads, and produce Fruit.

In the Choice of these Trees, observe first, the Difference of their Shoots and Leaves, (if they have any upon them) to distinguish their different Sorts; also prefer those that have two good Buds in each Stock, (for many of them have but one, which will always produce an irregular Head); the Straitness of the Stem, Freshness of the Branches, and Plumpness of the Bark, are necessary Observations.

When you have furnish'd your self with a Parcel of Trees, you must prepare a moderate Hot-bed of Tanners-bark, in Length and Breadth according to the Number of Trees; then put your Trees into a Tub of Water upright, about half-way of the Stems, leaving the Head and upper Part of the Stem out of the Water, the better to draw and imbibe the Moisture: In this Situation they may remain two or three Days, (according to their Plumpness when you receiv'd them); then take them out, and clean their Roots from all Filth, cutting off all broken or bruised Roots, and all the small Fibres, which are quite dry'd by being so long out of the Earth, and scrub the Stems with an hard Hair-brush, cleaning them afterwards with a Cloth; then cut off the Branches about six Inches from the Stem; and having prepar'd a Quantity of good fresh Earth, mix'd with very rotten Neats-dung, plant your Trees therein, observing never to put them into large Pots, for if they are but big enough to contain their Roots, it is sufficient

ficient at first Planting, and be sure to put some Potshards and large Stones in the Bottom of each Pot, to keep the Holes at the Bottom of the Pots from being stopp'd with Earth, that the Water may freely pass off; then plunge these Pots into the Bark-bed, watering them well to settle the Earth to their Roots, frequently repeating the same as they may require it; and observe to screen the Glasses of your Hot-bed from the Sun in the Heat of the Day.

If your Trees take to growing kindly, (as there is little Reason to doubt of it, if the Directions given be duly observ'd) they will have made strong Shoots by the Beginning of *June*; at which Time you should stop their Leaders to obtain lateral Branches, to furnish their Heads; and now you must give them Air plentifully, and begin to harden them that in the Middle of *July* they may be remov'd into the open Air, in some warm Situation, defended from the great Heat of the Sun and Winds, that they may be harden'd before Winter: About the End of *September* you should house these Plants, setting them at first in the Front of the Green-house near the Glasses, keeping the Windows open at all Times when the Weather will permit; and about the latter End of *October*, when you bring in the *Myrtles*, and other less tender Trees, you must set your *Oranges* in the warmest and best Part of the House, placing lower Plants or Trees in the Front to hide their Stems: During the Winter, let your Waterings be frequent, but give them but little at a Time, for now their Heads are but small, and therefore incapable to discharge too great a Quantity of Moisture, and take take great Care to guard them from Frost.

In the Spring, when you begin to take out some of your hardest Sorts of Plants, to thin your House, wash and cleanse the Stems and Leaves of your *Orange-Trees*, taking out the upper Part of the Earth in the Pots, filling them up again with good fresh, rich Earth, laying thereon a little rotten Neat's-Dung round the Outer-side of the Pots, but do not let it lie near the Stem of the Trees; then place them at wider Distances in the House, that the Air may circulate round their Heads, giving them Air discretionally as the Weather grows warm, but do not remove them into the open Air until the Middle of *May*, that the Weather is settled; for many times, when they are remov'd out too soon, the Mornings often proving Cold, gives them at least a great Check, and many times kills the extreme weak Part of the Shoots: Let the Situation for your *Orange-Trees*, during the Summer Season, be as much defended from the Sun in the Heat of the Day, and strong Winds, as possible, by tall Trees and Hedges, both of which, if they are expos'd thereto, are very hurtful to them.

As these Trees advance, it will be necessary in the Summer, to stop strong Shoots when they grow irregular, to force out aeral Branches to fill the Head, but do not pinch off the Tops of all the Shoots (as is the Prac-

tice of some) which will fill the Tree with small Shoots, too weak to support Fruit, but endeavour to form a regular Head, and obtain strong Shoots, taking away weak trifling Branches where they are too close.

During the Summer Season your *Orange-Trees* will require frequent and plentiful Waterings in dry Weather, especially if they are large; therefore you should endeavour to have the Water as near the Trees as possible to save the Trouble of carrying it, which, in a large Quantity of Trees, takes up much Time: Your Water should be soft and expos'd to the Air, but never add Dung of any Sort thereto, which altho' by many frequently recommended, yet has always been found destructive to these and all other Trees, if much us'd; it being like hot Liquors to human Bodies, which at first taking seem to add Vigour; yet certainly leave the Body weaker after some Time than before.

Your *Orange-trees* will require to be shifted and new potted every Year; therefore you must prepare a Quantity of good Earth, at least a Year before you intend to use it, that it may be well mix'd, and perfectly rotten; the best Season for this Work is about the End of *April*, that they may have taken fresh Root before they are remov'd out of the Green-house, and when this Work is perform'd, it will be necessary to let them remain in the House a Fortnight longer than usual, to be well settled.

In the performing this Work, after you have drawn the Trees out of the Pots, you must cut off all the Roots round the Outside of the Ball of Earth, and take away all mouldy Roots (if any such be) then with a sharp Iron Instrument, get as much of the old Earth from between the Roots as possible, being careful not to break or tear the Roots; then set the Root of the Tree into a large Tub of Water, for about a Quarter of an Hour, to soak the under Part of the Ball of Earth; and afterwards scrub the Stems of the Trees with a hard hair Brush, cleaning them and the Heads with Water and a soft Woollen Cloth; your Pots being prepar'd with some Potshards and large Stones in the Bottom, put some of your fresh Earth into the Pot about two Inches thick, and having plac'd your Tree thereon in the Middle of the Pot upright, fill it up with the same rich Earth, pressing it down hard with your Hands; then water the Tree all over the Head, with a Watering-pot that has a Rose upon the Spout, to let the Water fall light and thick; (as in a Shower of Rain) and in watering these Trees, do it in the same Manner, during the Time they abide in the House after shifting; this will greatly refresh their Heads, and promote their taking fresh Roots.

When you first set these Trees abroad after shifting, you should place them near the Shelter of Hedges, and fasten their Stems to strong Stakes, to prevent their being disturb'd by Winds, which sometimes will blow fresh-planted Trees out of the Pots, if too much expos'd

expos'd thereto, and thereby greatly injure their new Roots.

If old *Orange-trees* have been ill manag'd; and their Heads become ragged and decay'd, the best Method to restore them, is, to cut off the greatest Part of their Heads early in *March*, and draw them out of the Tubs or Pots, and shake off the Earth from their Roots, cutting away all small Fibres and mouldy Roots; and then soak and clean their Roots, Stems, and Branches, planting them into good Earth, and setting them into a hot Bed of Tanner's Bark, as was directed for such Trees as came from abroad, managing them in the same Manner; by this Means they will produce new Heads, and in Two Years time become good Trees again. But if these are large Trees, and have grown in Tubs for several Years, your best Way will be, to prepare a parcel of rough Baskets (such as are us'd for basketing Ever greens, when sent to a distant Place); let these be somewhat less than the Tubs you design to plant your Trees into, then plant your Trees herein, plunging them into the hot Bed; and about the Beginning of *July*, when your Trees have good Shoots, you may remove them into the Tubs, with their Baskets about them, filling the empty Space with the same good Earth; this will preserve your Tubs from rotting in the Bark, and the Trees will do equally as well as if planted into the Tubs at first, provided you are careful in setting in the Baskets not to disturb their Roots; and also, let them remain in the Green-house a Fortnight or three Weeks after planting before you set them abroad.

AURICULA MURIS or PILOSELLA; Mouse-Ear.

This is a Sort of Hawkweed, with small hairy Leaves, which are white underneath; the Plant trails upon the Ground, taking Root at the Joynts, by which Means it will soon spread over a large Compass of Ground.

This is very common in *England*; it grows chiefly on dry barren Places, or upon old Walls.

AURICULA URSI; [*i. e.* Bear's-Ear; so call'd, because the Antients fancied it resembled the Ear of a Bear] Bear's-Ear, or Auricula.

The Characters are;

It hath a perennial Root; the Leaves are smoother and thicker than those of the Primrose; the Cup of the Flower is shorter, so that the Tube appears naked; the Flower is shap'd like a Funnel, the upper Part is expanded and divided into five Segments; this is succeeded by a globular Seed-Vessel, containing many small Seeds.

To enumerate the Diversities of this Plant, would be almost endless and impossible; for every Year produces vast Quantities of new Flowers, differing in Shape, Size, or Colour of the Flowers; and also in the Leaves of these Plants, there is as great a Variety, so that the skilful Florist, is oftentimes capable

of distinguishing the particular Sorts thereby.

But as it seldom happens, that such of these Flowers as are at one Time in great Esteem, continue to be regarded a few Years after (there being still finer or larger Flowers produced from Seeds, which are what the Florists chiefly seek after) so it would be needless to mention any of them: Wherefore I shall proceed to give the Characters of a good *Auricula*.

1. *The Stem of the Flower should be lofty and strong.*

2. *The Footstalk of the Flower should be short, that the Umbel may be regular and close.*

3. *The Pipe or Neck of each Flower should be short, and the Flowers large and regularly spread, being no ways inclinable to cup.*

4. *That the Colours are very bright and well mixed.*

5. *That the Eye of the Flower be large, round, and of a good White, or Yellow, and that the Tube or Neck be not too wide.*

All Flowers of this kind, that want any of the above-mention'd Properties, are now rejected by every good Florist; for as the Varieties every Year increase from Seeds, so the bad ones are turn'd out to make Room for their Betters; but in some People the Passion for new Flowers so much prevails, that supposing the old Flower greatly preferable to a new one, if it is of their own raising, the latter must take Place of the old one.

In order to obtain good Flowers from Seeds, you must make choice of the best Flowers you have, which should be expos'd to the open Air, that they may have the Benefit of Showers, without which, they seldom produce good Seeds; the Time of their Ripening is in *June*, which you will easily know, by their Seed-vessel turning to a brown Colour and opening; you must therefore be careful lest the Seeds be scatter'd out of the Vessel, for it will not be all fit to gather at the same Time.

The Time for sowing this Seed, is commonly in *August*; but if it be sown any Time before *Christmas*, it will be Time enough.

The best Soil for this Seed, is good fresh, light sandy Mould, mix'd with very rotten Neat's Dung, or Tanner's Bark; with this you should fill your Pots, Boxes, or Baskets, in which you intend to sow your Seeds; and having level'd the Surface of the Earth very smooth, sow your Seeds thereon, covering it very lightly with rotten willow Mould, then cover the Box, &c. with a Net or Wire, to prevent the Cats, Fowls, &c. from scratching out, or burying your Seeds too deep; let these Boxes, &c. be placed so as to receive half the Day's Sun, during the Winter Season; but in the Beginning of *March*, remove them where they may have only the Morning Sun till ten of the Clock, for your young Plants will now soon begin to appear, which if expos'd to one whole Day's Sun only, will be all destroy'd.

During the Summer Season in dry Weather, often refresh them with Water, but never give them too great Quantities at once: In the *July* following, your Plants will be large enough to transplant, at which Time you must prepare a Bed, or Boxes, fill'd with the above-mention'd Soil, in which you may plant them about three Inches square, and (if in Beds) you must shade them every Day, till they are thoroughly rooted, as also in very hot dry Weather; but if they are in Baskets or Boxes, they may be removed to a shady Place.

When you have taken all your Plants which are now come up out of your Boxes or Pots, level the Earth gently again, for it often happens, that some of the Seeds will lie in the Ground two Years before they appear, especially, if they were cover'd too deep when sown.

The Spring following, many of these Flowers will shew, when you may select such of them as have good Properties, which should be removed each of them into a Pot of the same prepar'd Earth, and preserved until the next Season, at which Time you will be capable to form a Judgment of the Goodness of the Flower; but those that produce plain-colour'd, or small Flowers should be taken out, and planted in Borders in the out Parts of the Garden, to make a Shew, or gather for Nosegays, &c. the others which do not produce their Flowers the same Year, may be taken up, and transplanted into a fresh Bed, to remain till you see how they will prove.

The Manner of propagating these Flowers when obtain'd, is from Off-sets, or Slips, taken from the old Roots in *April*, when the Flowers are in Bloom; these Off-sets must be planted into small Pots, fill'd with the same Sort of Earth, as was before directed for the Seedlings, and during the Summer Season, should be set in a shady Place, and must be often refresh'd with Water, but in the Winter should be shelter'd from the violent Rains; the Spring following, these young Plants will produce Flowers, tho' but weak; soon after they are past flowering, you must put them into larger Pots, and the second Year they will blow in Perfection.

But in order to obtain a fine Bloom of these Flowers, you must observe the following Directions.

1st. Preserve your Plants from too much Wet in Winter, which often rots and spoils them, but let them have as much free open Air as possible; nor should they be too much expos'd to the Sun, which is apt to forward their budding for Flower too soon; and the frosty Mornings which often happen in *March*, do thereby destroy their Buds, if they are not protected therefrom.

Secondly, In the Beginning of *February*, if the Weather is mild, you must take off the upper Part of the Earth in your *Auriculas* Pots, as low as you can without disturbing their Roots, and fill up the Pots with fresh rich Earth, which will greatly strengthen them for Bloom; as also prepare your Offsets for

transplanting in *April*, by causing them to push out new Roots.

Thirdly, You must cover your Pots with Mats in frosty Weather, during this Time of their budding for Flower, lest the sharp Mornings blight them, and prevent their blowing.

Fourthly, When your Flower-Stems begin to advance, and the blossom Buds grow turgid; you must protect them from hasty Rains, which would wash off their white mealy *Farina*, and greatly deface the Beauty of their Flowers; but at the same Time, observe to keep them as much uncover'd as possible, otherwise their Stems will be drawn up too weak to support their Flowers, (which is often the Case when their Pots are placed under Walls) and give them gentle Waterings to strengthen them; but let none of the Water fall into the Center of the Plant or among their Leaves.

Fifthly, when your Flowers begin to open, you should remove their Pots upon a Stage (built with Rows of Shelves, one above another, and cover'd on the Top to preserve them from Wet; this should be open to the Morning Sun, but shelter'd from the Heat of the Sun in the Middle of the Day) in this Position they will appear to much greater Advantage, then when the Pots stand upon the Ground; for their Flowers being low, their Beauty is hid from us; whereas when they are advanced upon Shelves, we see them in a full View; in this Situation they may remain, until the Beauty of their Flowers are past; when they must be set abroad to receive the Rains, and have open free Air, in order to obtain Seeds, which will fail if they are kept too long under Shelter. When your Seed is ripe, observe to gather it when it is perfectly dry, and expose it to the Sun in a Window upon Papers, to prevent its growing mouldy, and let it remain in the Pods till the Season for sowing it.

AURICULA URSI MYCONI; *vide Verbascum*.

AXIS of a Plant. *Axis* is properly that round, smooth Cylinder, about which a Wheel is turn'd; whence, by way of Metaphor, that long, round, smooth Part, plac'd in the Center in some Fruits, or Cat-tails on Nut-Trees, &c. about which the other Parts are dispos'd, may be call'd the *Axis*. The French call it *Ame*, *Noyau*, or *Poinçon*.

AZEDARACH; The Bead-Tree.

The Characters of which are;

It hath pennated Leaves somewhat like those of the Ash; the Flowers consist of five Leaves, which expand in form of a Rose; in the Center of the Flower is a long fimbriated Tube, containing the Style; the Fruit is roundish and fleshy, containing a hard furrow'd Nut, which is divided into five Cells, each containing one oblong broadish Seed.

We have, at present, but one Species of this Tree in England; which is,

AZEDARACH.

AZEDARACH. Dod. The Bead-Tree.

This Tree is propagated only by Seeds (which may be obtain'd from *Italy* or *Spain*, where they annually produce ripe Fruits in the Gardens where they are planted; for it is not an Inhabitant of either of those Countries :) The Seeds or Berries should be sown in Pots fill'd with good fresh light Earth, and plung'd into a Hot-bed of Tanners-bark, where (if the Seeds were fresh) they would come up in about two Months time: When the Plants are come up, you should water them frequently, and begin to let them have a large Quantity of free Air, by raising the Glasses every Day; and in *July* you should expose them to the open Air, in a well shelter'd Situation, that they may be harden'd before Winter. In *October* you should remove the Pots into the Conservatory, where they should be plac'd near the Windows, that they may enjoy free open Air, when the Weather is open, for they don't care to be over-top'd with other Plants. During the Winter Season you must refresh them gently with Water, but by no means repeat this too often, nor give them too much each time; for their Leaves being dropp'd, they will not be in a Condition to throw off a Superfluity of Moisture.

In *March* following you may shake out your Plants from the Seed Pots, and divide them, planting each into a separate small Pot, fill'd with light fresh Earth, plunging them into a moderate Hot-bed, which will greatly promote their Rooting, and increase their Growth; but you should not draw them too much, but give them a large Share of Air when the Weather is good; and in *June* you should remove them out into the open Air as before; and during the three or four Winters, while the Plants are young, you must house them, to secure them from the Cold; but when the Plants are grown pretty large and woody, they will endure to be planted in the open Air: The best Season for this is in *April*, at which time you should shake them out of the Pots, being careful not to break the Earth from the Roots, but only pare off with a Knife the Outside of the Ball of Earth; then open your Holes, and put in the Plant, closing the Earth to its Roots, observing, if the Weather is dry, to give it some Water, which should be repeated twice a Week until the Plants have taken Root: But you must observe to plant them on a dry Soil, and in a warm Situation, otherwise they will be liable to miscarry in severe frosty Weather.

I have been inform'd, that there was formerly a large Tree of this Kind, in the Gardens of the Bishop of *London*, at *Fulham*, which produc'd Flowers several Years; but this, with many other valuable Trees, which were grown to a considerable Height in the same Gardens, have been long since demolish'd.

At present I don't know of any of these Trees in *England*, which are arrived to any considerable Stature; but I have transplanted one Tree, which is seven Years old, into the open Ground in the Physick-Garden, which I

find resists the Cold extremely well without any Shelter.

The outside Pulp of this Fruit is in some Countries eat, but I don't find it is much commended; but the Nut is by the Monks (and other Religious Persons in *Roman Catholic* Countries) bored thro' with an Awl, and strung as Beads, with which they say their *Pater-Noster*, which has occasion'd its being call'd the *Bead-Tree*.

AZEROLE, or L'AZAROLE; vide Me-pilus.



B A

BACCA; i. e. a Berry, is a round Fruit, for the most part soft, and cover'd with a thin Skin, containing Seeds in a pulpy Substance; but if it be harder, and cover'd with a thicker Skin, it is call'd *Pomum*; i. e. an Apple.

BACCÆ; are small roundish Fruits, that grow scattering upon Trees and Shrubs; and in that are distinguish'd from *Acini*, which are Berries hanging in Clusters.

Bacca, in a more strict Sense, are used for a smaller thin-skin'd Fruit, of a soft Pulp and Flesh, including moist Seeds in a thinner Membrane.

BACCHARIS; Plowman's Spikenard; *vide Conyza*.

BACCIFEROUS; [*Baccifer*, *Lat.* of *Bacca* a Berry, and *fero*, *Lat.* I bear] is an Epithet added to the Names of any Trees, Shrubs, or Plants, that bear Berries, as *Bryony*, *Dwarf Honey-suckle*, *Lily of the Valley*, *Asparagus*, *Butcher's Broom*, *Night-Shade*, *Solomon's-Seal*, and many others.

BALAUSTIA; *vide Punica*.

BALAUSTIUM; The Flower of the wild Pomegranate.

BALLOTE; [*Βαλλοτή*, so call'd by *Dioscorides*, and is reckon'd among the Plants that were known to the Antients; the Virtues of which *Dioscorides* hath sufficiently set forth. It is also call'd *Herba jaculatoria*, because it is good for those wounded with Darts.] Stinking Black Horehound.

The Characters are;

It hath Leaves like the Dead-Nettle; the Flowers are produc'd in Bunches at the Joints of the Stalks, from the Pedicle of the Leaves, which have one single Footstalk, and stand but on one Side of the Stalks; the Cup of the Flower is tubulous, and hath five Angles, divided into five Segments at the Top; the Galea (or Crest) of the Flower is hollow, and the Beard is cut into three Parts, the middle Part being broad, and

and shap'd like a Heart; each Flower is succeeded by four naked Seeds.

We have two Varieties of this Plant growing wild in England; which are,

1. **BALLOTE.** *Matth. 825. Marrubrium, nigrum; five Balloite. J. B.* The stinking Black Horehound.

2. **BALLOTE;** *flore albo. Tourn.* Stinking Black Horehound, with white Flowers.

The first of these Plants is common upon most dry Banks near London, and is seldom suffer'd to have a Place in Gardens; but this being a Plant sometimes used in Physick, I thought proper to mention it in this Place; it may be easily propagated by either Seeds or Roots, but is very apt to increase too fast in a Garden. This is the common *Black Horehound* of the Shops: The second Sort is a Variety of the first, which is found sometimes with the other wild.

BALM; *vide Melissa.*

BALSAMINA; The Female Balsamine, or Balsam Apple.

The Characters are;

It hath an anomalous Flower, which consists of an unequal Number of Leaves, having sometimes two, three, four, six, or more Leaves, with a Calcar or Spur to the Flower: These Flowers are succeeded by turbinated Vessels, resembling Pods, which, when ripe, upon the first Touch burst, and cast forth several roundish Seeds.

The Species are;

1. **BALSAMINA lutea;** *five, Noli me tangere. C. B.* The Yellow Balsamine; or, Touch me not.

2. **BALSAMINA fœmina;** *flore purpureo.* The Female Balsamine, with Purple Flowers.

3. **BALSAMINA fœmina;** *flore candido. H. L.* The white Female Balsamine.

4. **BALSAMINA fœmina;** *flore rubro. H. L.* The Red Female Balsamine.

5. **BALSAMINA fœmina;** *flore majore candido. Tourn.* The large white-flower'd Balsamine.

6. **BALSAMINA fœmina;** *flore majore specioso. Tourn.* The large specious flower'd Female Balsamine.

7. **BALSAMINA fœmina;** *flore partim candido, partim purpureo.* The purple and white-strip'd Balsamine.

8. **BALSAMINA fœmina;** *flore majore, elegantissimo variegato.* The large-flower'd strip'd Balsamine.

9. **BALSAMINA fœmina;** *flore majore pleno, elegantissimo variegato.* The double large-flower'd strip'd Balsamine; or, Immortal Eagle Flower.

The first of these Species is preserv'd in Gardens, for the Diversion it affords when the Seed Vessels are ripe, by desiring ignorant Persons to gather them, who are surpriz'd to find, upon the first Touch, that the Pods fly to Pieces in their Hands: This Plant is very hardy in respect to Cold; and altho' it is Annual, yet, if suffer'd to cast its Seeds, will come up every Spring without any Care; it delights best in moist shady Places, where,

if it is not rooted out, it will multiply fast enough.

The other Sorts are commonly rais'd on Hot-beds in the Spring, and afterwards planted into Pots or Borders, to adorn Court-Yards and Parterres. The second, third, and fourth Sorts will come up in the common Ground, without any artificial Heat, and make stronger Plants than when rais'd in a Hot-bed, and stand longer in Flower, but the four last mention'd Sorts are much tenderer, and must be rais'd on a Hot-bed, and afterward planted in Pots, and set into a fresh Hot-bed to bring them forward (especially the last Sort) which otherwise will not flower soon enough to produce ripe Seeds. There are two different Kinds of this large double-flower'd Balsamine, one is brought from the *West-Indies*, by the Name of the *Cockspur*; this is very apt to produce large strong Plants, but rarely begins to flower till the End of the Summer, and then very often hath but small Quantities of Flowers, and seldom produces ripe Seeds in England.

The other Sort is brought from China, by the Name of *Immortal Eagle Flower*; this Plant produces large beautiful double Flowers in great Quantities, and is one of the finest annual Plants we have, continuing a long time in Flower (especially if shelter'd from the Violence of Wind and Rain, both of which are great Enemies to this Plant); this Sort also ripens Seeds very well, but is apt to degenerate in a few Years with us to single Flowers, and plain Colours.

These Plants must be taken great Care of while young, and in the Hot-bed, particularly to give them as much free Air as possible, to prevent their running up too slender; nor must they have much Water, which often rots them at Bottom near the Surface of the Ground.

When you put these Plants into Pots, observe to chuse such as have clear spotted Stems, which always produce strip'd Flowers, and those with greenish Stems white Flowers, and the red Stems red Flowers: So that if you have Plants enough, you need only take the strip'd ones. And in order to preserve them from degenerating, you should take off all single or plain-colour'd Flowers from your Plants, and not suffer them to seed, by which means you will preserve this beautiful Plant many Years longer than you otherways could.

BALSAMITA; *Costus Hortorum, or Cost-Mary.*

The Characters are;

The Flowers are naked, and of a yellow Colour, growing in Umbels on the Top of the Stalks; the Leaves are intire, and are crenated about the Edges.

We have at present but one Species of this Plant in the *English* Gardens, which is,

BALSAMITA; *major. Dod.* The large Cost-Mary.

This Plant was formerly in greater Request than it is at present; many People were fond of

of it in Soups with other Herbs; and its Use in Medicine is, at present, but small: However as it hath been an old Garden-Herb, I thought proper to mention it in this Place.

This Plant increases very fast at the Root, and will grow in almost any Soil or Situation, so that whoever hath a mind to propagate it, need only plant a few Slips in the Spring or Autumn, in any common Border, and they will soon be furnish'd with enough of it.

BAMIA MOSCHATA; *vide* Ketmia.

BANANA; *vide* Musa.

BARBA CARPA; *vide* the Appendix.

BARBA JOVIS; Jupiter's Beard, or Silver Bush.

The Characters are;

It hath pennated or winged Leaves; the Flowers are papilionaceous, and are succeeded by short oval Pods, in which is, for the most part, contained one roundish Seed.

The Species are;

1. **BARBA JOVIS**, *pulchre lucens*. J. R. The Silver Bush; *vulgô*.

2. **BARBA JOVIS**, *Hispanica, incana, flore luteo*. Tourn. Spanish Jupiter's Beard.

3. **BARBA JOVIS**, *Caroliniana, arborescens, Pseudoacaciæ foliis*. Bastard Indigo *Incolis*. Rand. *Art. Phil. N. 407*. Bastard Indigo, or Carolina Barba Jovis.

4. **BARBA JOVIS**, *Africana, foliis viridibus pinnatis, flore cæruleo*. Boerb. *Ind.* The African Jupiter's Beard, with deep green Leaves and blue Flowers.

The first of these Plants is very common in many Gardens; the second is, at present, more rare with us; the third Sort was rais'd from Seeds sent from *America*, by Mr. Catesby, and is by the Inhabitants made into a coarse sort of *Indigo*: This grows to be a large Shrub, and will resist the Cold in the open Air very well; it is also a beautiful flowering Shrub, and for Diversity merits a Place in Quarters of curious flowering Trees. This Plant will sometimes produce ripe Seeds, by which means it may be easily propagated, and will also take Root by laying down the Branches in the Spring, which by the next Spring will be fit to transplant out: It delights in a sandy dry Soil, and must have Room to spread its Branches, which extend a considerable Distance from the Stem: This Tree is also subject to split if expos'd to strong Winds.

The fourth Sort may be preserv'd with the first and second in a common Green-House: They are not very tender, but require much free Air in good Weather and frequent Waterings: They are all propagated by Seeds, which should be sown on a Hot-bed in the Spring, and transplanted into Pots of good light Earth (but not over-dung'd) and hous'd in Winter, with Myrtles, &c. and have a good Effect in adding to the Diversity of the Green-house: These Plants will sometimes take Root from Cuttings; but as 'tis difficult to obtain Plants this Way, and the Seeds many times ripen

very well with us, so I would recommend the raising them that Way, as the most sure and expeditious.

BARBAREA, or Winter-Cress; *vide* the Appendix.

BARDANA; Burdock.

BAROMETER, [of *Barometron*, of *Baros* a Weight or Burden, and *metron* a Measure] is an Instrument or Machine for measuring the Weight of the Atmosphere, or the minute Variations of the Weight or Pressure of the incumbent Air, in order to determinate the Changes of Weather.

This Machine is founded on the *Toricellian* Experiment, so call'd from the Inventor *Toricellius*.

It consists of a long Tube of Glass, hermetically sealed at one End; and being fill'd with Quicksilver, is inverted so as to have one End of it emerg'd in a Basin of stagnant Quick-silver, and the other hermetically seal'd, which is expos'd to the Pressure of the outward Air: Out of which open End (after such Immersion) the Quicksilver in the Tube being suffer'd to run as much as it will into the stagnant Quick-silver in which that Mouth or open End is immers'd; there is wont to remain a Cylinder of Quicksilver suspended in the Tube, about twenty-eight, twenty-nine, or thirty Inches high, measuring from the Surface of the stagnant Quicksilver perpendicularly; but more or less within such Limits, according as the Weight or Pressure of the Air incumbent on the external stagnant Quicksilver expos'd to it, is greater or lesser, leaving the upper Part of the Tube void, or at least empty of common Air.

The *Phænomena* of the *Barometer* are various; and the Causes assign'd for them by several Authors as various; nor is the Use of it in predicting the Weather yet perfectly ascertain'd.

The greatest Height the Mercury has been known to stand at *London*, is thirty Inches three-Eighths, and its least twenty-eight Inches: And though, as Mr. Boyle observes, the *Phænomena* of the *Barometer* are so very precarious, that it is very difficult to form any general Rules about the Rise and Fall thereof in that which seems to hold most universally, *viz.* That when the high Winds blow, the *Mercury* is the lower, sometimes fail; Yet the following Observations have been made by several Authors.

Dr. Halley observes, that in calm Weather, when the Air is inclin'd to rain, the Mercury is continually low; in serene good settled Weather, high.

That on great Winds, tho' unaccompany'd with Rain, the Mercury is lowest of all, with regard to the Point of the Compass the Wind blows on; that, *ceteris paribus*, the greatest Heights of the Mercury are on Easterly and North-easterly Winds; that after great Storms of Wind, when the Mercury has been low it rises again very fast.

That in calm frosty Weather it stands high.

Y

That

That the more northerly Places find greater Alterations than the more southern; and that within the *Tropicks*, and near 'em, there is little or no Variation of the Mercury at all.

Dr. Beal observes, That, *ceteris paribus*, the Mercury is higher in cold Weather than in warm, and usually higher at Morning and Evening than at Mid-day.

That the Mercury is higher in settled and fair Weather than either a little before, or after, or in the Rain; and that it generally descends lower after Rain than it was before it: If it chance to rise higher after Rain, it is generally follow'd by a settled Serenity.

That there are frequently great Changes in the Air without any perceptible Alterations in the *Barometer*.

As to the Predictions from the *Barometers*, Dr. Halley has found,

That the Rising of the Mercury forebodes fair Weather after foul, and an Easterly or North-easterly Wind.

That the Falling of the Mercury portends Southerly or Westerly Winds, with Rain, or stormy Winds, or both.

That in a Storm the Mercury beginning to rise, is a pretty sure Sign that it begins to abate.

Mr. Patrick observes, That the Falling of the Mercury in hot Weather presages Thunder: That when foul Weather happens after the Fall of the Mercury, it seldom holds long: And the same is observ'd, if fair Weather succeeds presently after its Rise.

Dr. Halley also observes, That within the *Tropicks*, and near them, there is very little or no Variation of the Height of the Mercury at all.

Hence Mr. Pointer conceives, That the principal Cause of the Rise and Fall of the Mercury is from the variable Winds which are found in the *Temperate Zones*, and whose great Unconstancy here in *England* is most notorious.

A second Cause he takes to be, uncertain Exhalation and Perspiration of the Vapours lodging in the Air, whereby it comes to be at one time much more crowded than at another, and consequently heavier; but this latter in a great measure depends upon the former.

And from these Principles he endeavours to explain the several *Phænomena* of the *Barometer*.

1. The Mercury's being low, inclines it to Rain, because the Air being light, the Vapours are no longer supported thereby, being become specifically heavier than the Medium wherein they are floated; so that they descend towards the Earth, and in their Fall, meeting with other aqueous Particles, they incorporate together, and form little Drops of Rain; but the Mercury's being at one Time lower than another, is the Effect of two contrary Winds blowing from the Place where the *Barometer* stands; whereby the Air of that Place is carried both Ways from it, and consequently the incumbent Cylinder of Air is diminish'd, and accordingly the Mercury sinks: As for instance, if in the *German Ocean* it

should blow a Gale of Westerly Wind, and at the same Time an Easterly Wind in the *Irish Sea*; or if in *France* it should blow a Northerly Wind, and in *Scotland* a Southerly, it must be granted that that Part of the Atmosphere impendent over *England* would thereby be exhausted and attenuated, and the Mercury would subside, and the Vapours which before floated in those Parts of the Air of equal Gravity with themselves, would sink to the Earth.

2. The greater Height of the *Barometer* is occasion'd by two contrary Winds blowing towards the Place of Observation, whereby the Air of other Places is brought thither and accumulated; so that the incumbent Cylinder of Air being increas'd both in Height and Weight the Mercury pressed thereby must needs rise and stand high, as long as the Winds continue so to blow; and then the Air being specifically heavier, the Vapours are better kept suspended, so that they have no Inclination to precipitate and fall down in Drops; which is the Reason of the serene good Weather, which attends the greater Heights of the Mercury.

3. The Mercury sinks the lowest of all by the very rapid Motion of the Air in Storms of Wind.

For the Tract of the Region of the Earth's Surface, wherein these Winds rage, not extending all round the Globe, that stagnant Air which is left behind, as likewise that on the Sides, cannot come in so fast as to supply the Evacuation made by so swift a Current, so that the Air must necessarily be attenuated when and where the said Winds continue to blow, and that more or less, according to their Violence: Add to which, that the horizontal Motion of the Air being so quick as it is, may, in all Probability, take off some Part of the perpendicular Pressure thereof; and the great Agitation of its Particles, is the Reason why the Vapours are dissipated, and do not condense into Drops, so as to form Rain, otherwise the natural Consequence of the Air's Rarefaction.

4. The Mercury stands the highest upon an Easterly or North-easterly Wind, because in the great *Atlantick Ocean* on this Side the thirty-fifth Degree of North Latitude, the Westerly and South-westerly Winds blow almost always Trade; so that when-ever here the Winds come up at East and North-East, 'tis sure to be check'd by a contrary Gale as soon as it reaches the Ocean; wherefore, according to what is made out in the second Remark, the Air must needs be heap'd over this Island, and consequently the Mercury must stand high, as often as these Winds blow.

This holds true in this Country; but is not a general Rule for others, where the Winds are under different Circumstances: And he says, he has often seen the Mercury here as low as twenty-nine Inches upon an Easterly Wind, but then it blew exceeding hard, and so comes to be accounted for by what was observ'd upon the third Remark.

5. In calm frosty Weather, the Mercury generally stands high, because, as he conceives, it seldom freezes but when the Winds come out of the *Northern* and *North-eastern* Quarters, or at least unless those Winds blow at no great Distance off:

For the Northern Parts of *Germany*, *Denmark*, *Sweden*, *Norway*, and all that Tract, from whence North-eastern Winds come, are subject to almost continual Frost all the Winter, and thereby the lower Air is very much condens'd, and in that State is brought hitherwards by those Winds; and being accumulated by the Opposition of the *Westerly* Wind blowing in the Ocean, the Mercury must needs be press'd to a more than ordinary Height; and as a concurring Cause, the shrinking of the lower Parts of the Air into lesser Room by Cold, must needs cause a Descent of the upper Parts of the Atmosphere, to reduce the Cavity made by this Contraction to an *Equilibrium*.

6. After great Storms of Wind, when the Mercury has been very low, it generally rises again very fast: He says, he once observ'd it to rise an Inch and a half in less than six Hours after a long continu'd Storm of South-west Wind.

The Reason is, because the Air being very much rarefy'd by the great Evacuations that such continued Storms make thereof, the neighbouring Air runs in the more swiftly, to bring it to an *Equilibrium*, as we see Water runs the faster for having a great Declivity.

7. The Variations are greater in the more northerly Places, as at *Stockholm* greater than at *Paris* [compar'd by Mr. *Pascal*] because the more northerly Parts have usually greater Storms of Wind than the more southerly, whereby the Mercury should sink lower in that Extreme; and then the northerly Winds bringing the condens'd and pondrous Air from the Neighbourhood of the Pole, and that again being check'd by a Southerly Wind, at no great Distance, and so heap'd up, must of Necessity, make the Mercury in such Case stand higher in the other Extreme.

8. This Remark, that there is little or no Variation near the Equinoctial, does above all others confirm the Hypothesis of the variable Winds being the Cause of these Variations of the Height of the Mercury; for in the Places above-named, there is always an easy Gale of Wind, blowing nearly upon the same Point, viz. E. N. E. at *Barbadoes*, and E. S. E. at *St. Helena*; so that there being no contrary Currents of the Air to exhaust or accumulate it, the Atmosphere continues much in the same State.

However, upon Hurricanes (the most violent of Storms) the Mercury has been observ'd very low; but this, but once in two or three Years, and it soon recovers its settled State, of about twenty nine Inches and a half.

Dr. *Wallis* also made the following observations on the *Barometer*;

That in thick foggy Weather, he found his Quicksilver to rise, which he ascrib'd to the Heaviness of the Vapours in the Air.

That in Sun-shiny Weather it rose, and commonly the clearer, the more; and this he thought might be imputed partly to the Vapours rais'd by the Sun, and making the Air heavier, increasing the elastick or springy Power of the Air: Which latter, he rather adds, because he had sometimes observ'd in Sun-shiny Weather, when Clouds had come for some considerable Time, as suppose an Hour or two, the Quicksilver has fallen; and then upon the Sun's breaking out again, it has risen as before.

In rainy Weather it uses to fall, the Reason of which is obviuous, because the Air is lightened by so much as falls, in snowy Weather likewise; but not so much as in Rains: And he had sometimes observ'd it, upon a hoar Frost falling in the Night.

In windy Weather he found it generally to fall, and that more universally, and more discernibly than upon Rain, which he attributed to the Winds moving collaterally, and thereby not suffering it to press so much directly downwards; the like of which we see in Swimming, &c.) and that he had never found it lower than in high Winds.

That he had divers Times upon discerning his Quicksilver to fall, without any visible Cause at Home, look'd abroad, and found (by the Appearance of broken Clouds or otherwise) that it had rain'd not far off, tho' not with them, whereupon the Air being then lightened, the heavier Air with them, where it rained not, might have in Part discharg'd itself on that lighter.

Dr. *Lister's* Observations on the *Barometer* are as follow.

In *England* in a violent Storm, or when the Quicksilver is at the very lowest, it then visibly breaks, and emits small Particles (as he informs us he had more than once observ'd) which Disorder he looks upon as a kind of fretting; and consequently at all Times of its Descent, it is more or less upon the Fret.

In this Disorder of the Quicksilver, he imagines it to have its Parts contracted; because the Quicksilver then emits fresh Particles of Air into the Tube, which increasing the Bulk of the Air, and consequently its Elasticity; the Quicksilver is necessarily depress'd thereby.

And that much Air is mix'd with it, appears from the Application of a heated Iron to the Tube, as is practic'd in the purging of it that Way.

Now when the Quicksilver rises in the Tube (which it certainly does both in hot and frosty Weather) it may then be said to be in a natural State, free, open, and expanded like itself, which it seems it ever is within the Tropicks, and with us only in very hot, and very frosty Weather.

But when it descends, it is then contracted, and as it were convuls'd, and drawn together; as it mostly is in our Climate of *England*, and more or less (as we guess) in all Places on this Side the Tropicks.

Which

Which Contraction plainly appears from the concave Figure of both Surfaces, not only in that of the Quicksilver in the Tube, but also, if well observ'd, in that which stagnates in the Pot or Dish itself.

The Difficulty seems to lie in reconciling the same Effect of the Quicksilver's rising in the Tube, from such seemingly different Causes, as great Heat, and intense Frost: And those who shall assent in one Particular, and grant that Warmth is a probable Cause of its Restitution to its Nature, will yet be at a Stand how to imagine, that great Frost should likewise bring the Quicksilver nearer to its own Nature too.

To which he answers, that *Salts* liquified will coagulate or crystalize, *i. e.* will return to their own proper Natures, both in Cold, and in Heat; and therefore, tho' most Men practise the setting them in a cool Cellar for that Purpose, yet some (as *Zwelfer*) advise, as the best Means to have them speedily and fairly crystaliz'd, to keep them constantly in *Balneo*.

Thus also the *Lympha* of the *Blood* becomes a Jelly, if it be set in a cool Place, and the same is inspissated in like Manner by Warmth.

This Account of *Dr. Lister's*, however ingenious, is objected against, as coming far short of accounting for the *Phænomena* of the *Barometer*, and that in some respects it contradicts them.

The Changes of the Weight of the Atmosphere, must be laid down as the Cause of those in the *Barometer*; but then whence those Alterations arise in the Atmosphere, will be no easy Matter to determine.

It is probable the Winds which are driven this or that Way, may have a great Share; and the Vapours and Exhalations arising from the Earth, also the Changes of the Air in the neighbouring Regions; and also the Flux and Reflux occasioned in the Air by the Moon.

Dr. Halley is of Opinion, the Winds and Exhalations are sufficient, and on their footing, gives a very probable Rationale of the *Barometer*, the Substance of which is to the Purpose following.

1. The Winds must necessarily alter the Weight of the Air in any particular Country, and that either by bringing together or accumulating a greater Quantity of Air, and so loading the Atmosphere of any Place; which will be the Case, as often as two Winds blow at the same Time, from opposite Points towards the same Point; or by sweeping away Part of the Air, and removing some of the Load, give Room for the Atmosphere to expand itself, which will be the Case, when two Winds blow at the same Time, and from the same Point opposite Ways; or in the last Place by cutting off the perpendicular Pressure of the Atmosphere, which happens as often as any single Wind blows briskly any Way; it being found by Experiment, that a strong Blast of Wind, even made by Art, will render the Atmosphere lighter, and

accordingly the Mercury in a Tube, under which it passes, as well as in another at a Distance from it, subsides considerably.

2. The cold, nitrous Particles, and even Air itself condens'd in the Northern Parts, and driven elsewhere, must load the Atmosphere, and increase its Pressure.

3. Dry, heavy Exhalations from the Earth, must increase the Weight of the Atmosphere, and heighten its Elastic Force, as the Specific Gravity of *Mensurums* are found to be increas'd, by dissolv'd Salts and Metals.

4. The Air being render'd heavier from these and the like Causes, is thereby the more able to support the Vapours, which being likewise intimately mix'd with it, and swimming every where equally throughout it, make the Weather serene and fair.

Again, the Air being made lighter from the contrary Causes, it becomes unable to support the Vapours, wherewith it is replete; these therefore precipitating, are gathered into Clouds, and those in their Progress coalesce into Drops of Rain.

These Things being observ'd, it appears pretty evident that the same Causes, which increase the Weight of the Air, and make it more able to support the Mercury in the *Barometer*, do likewise make a serene Sky and a dry Season; and the same Causes which render the Air lighter, and less able to support the Mercury, do likewise generate Clouds and Rain.

Hence, First, when the Air is lightest, and the Mercury in the *Barometer* lowest, the Clouds are very low; and when after Rain the Clouds break, and a calm Sky again shines forth, being purg'd of its Vapours, it appears exceedingly bright and transparent, and affords an easy Prospect of remote Objects.

Secondly, When the Air is heavier, and the Mercury stands higher in the Tube, the Weather is calm, tho' somewhat less clear, by Reason that the Vapours are dispers'd every where equally; if any Clouds now appear they are very high, and move slowly; and when the Air is heaviest of all, the Earth is frequently found envelop'd in pretty thick Clouds, which appear to be formed out of the grosser Exhalations, and which the Air is then able to sustain, tho' a lighter Atmosphere could not.

Thirdly, Hence it is, that with us the Mercury stands highest in the coldest Seasons, and when the Wind blows from the North, and North-East Corners: For in that Case there are two Winds blowing towards us at the same Time, and from opposite Corners, there being a constant West Wind found in the *Atlantick* Ocean, in a Latitude that corresponds to ours. To this it may be added, that the cold condens'd Air of the Northern Parts is brought hither in a North Wind.

Fourthly, Hence in the Northern Regions, the Variation of the Mercury is more sensible than in the Southern ones; the Winds being found both more strong, more frequent, more various,

various, and more opposite to each other in the former than the latter.

Lastly, Hence is it, that between the Tropicks, the Variation of the Mercury is scarce sensible; the Winds there being extremely gentle; and usually blowing the same Way.

Now this Account, however well adapted to many of the particular Cases of the *Barometer*, yet comes short of some of the most principal, and the most obvious ones; and is besides liable to several Objections.

For first, If the Wind were the sole Agent in effecting these Alterations, we should have no Alterations without a sensible Wind, nor any Wind without some Alteration of the Mercury; both which are contrary to Experience.

Secondly, if two Winds be suppos'd blowing from the same Place, *viz.* London, opposite Ways, *viz.* N. E. and S. W. there will be two others blowing from opposite Points, *viz.* N. W. and S. W. to the same Place; which two last will balance the first, and bring as much Air towards the Point, as the others swept from it. Or thus, in Proportion as the Air is carried off N. E. and S. W. the adjacent Air will crowd in from the other Points, and form a couple of new Currents in the Direction N. W. and S. E. to fill up the Vacancy, and restore the Equilibrium; this is a necessary Consequence from the Laws of Fluids.

Thirdly, if the Wind were the sole Agent, the Alterations in the Height of the Mercury, would only be relative or topical; there would be still the same Quantity supported at several Places taken collectively. Thus what a Tube at London lost, another at Paris, or at Pisa, or at Zurich, &c. would gain at the same Time. But the very contrary is found true in Fact; for from all the Observations hitherto made, the *Barometers* rise and fall together in several Parts of the Globe; so that it must be some Alteration in the absolute Weight of the Atmosphere, that accounts for the Rise and Fall of the Mercury.

Lastly, Setting all Objections aside, these popular *Phænomena*, the Fall of the Mercury before, and the Rise after Rain, are really unexplicable on the Foot of this Hypothesis; for suppose two contrary Winds sweeping the Air from over London, it is known but few Winds, if any, reach above a Mile high; all therefore they can do, will be to cut off a certain Part of the Column of the Air over London: If the Consequence of this be the Fall of the Mercury, yet there is no apparent Reason for the Rains following it: the Vapours indeed may be let lower, but it will only be till they come into an Air of the same specific Gravity with themselves, and there they will stick as before.

M. *Leibnitz* has endeavour'd to supply the Defects of this Hypothesis with a new one of his own. He asserts, That a Body immers'd in a Fluid, only weighs with that Fluid, while it is sustain'd thereby; so that when it ceases to be sustain'd, *i. e.* to fall, its Weight ceases to make a Part of the Fluid, which by this Means becomes lighter.

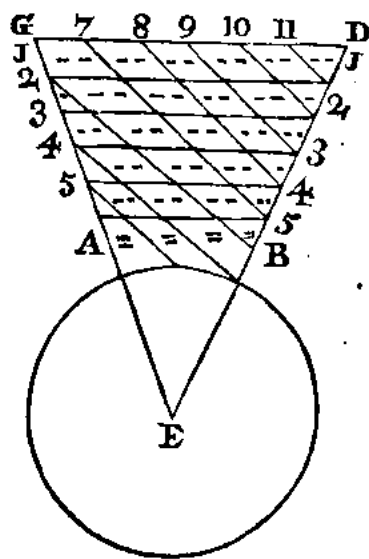
Thus, he adds, that the watry Vapours, while sustain'd in the Air, increase its Weight; but when let fall, cease to weigh along with it. Thus the Weight of the Air is diminish'd, and thus the Mercury falls, and Rain ensues.

But this Principle of M. *Leibnitz* is false, notwithstanding the Experiment he brings to confirm it, as Dr. *Desaguliers* has made appear by the Counter-Experiment. For while a Body is immers'd in a Fluid, whether it be equal with it, or heavier, or lighter than the Fluid, whether it be at Rest or in Motion, adds to the Fluid a Weight of an equal Bulk of the Fluid, as follows from that Law in *Hydrostatics*, that Fluids gravitate according to their perpendicular Altitudes.

But however, if this Principle of M. *Leibnitz* were true, yet it is defective, and that in the same respect with Dr. *Halley's*; nor would it account for the *Phænomena* more than the other.

For supposing the Vapours, by being condens'd, to be put in a Motion downward, and so ceasing to gravitate with the Atmosphere, they will therefore fall till they reach a Part of the Atmosphere of the same specific Gravity with themselves, and there they will hang as before: If the Mercury falls, it will be only during the Time of that Descent; for these once fix'd, the former Gravity is retriev'd; or were it not retriev'd, yet no Rain would ensue the Fall of Mercury.

In order to account for these Variations of the *Phænomena* of the *Barometer*, Mr. *Chambers* advances what follows: Suppose any Number of watry Vehicles, *v. g.* a Million, floating in any part of the Atmosphere, over any determinate Portion of the Globe; as for Instance, over A B; if the upper Vehicles be



condens'd by the Cold of the upper Regions, their specific Gravity will be increas'd, and they will descend; the horizontal Class *v. g.* to 2, 2 to 3, &c. where meeting with other Vehicles, not yet precipitated, they will coalesce or run into larger Vehicles, by the known Laws of Attraction.

Or, if we rather chuse to have the Wind act, let it drive horizontally or obliquely: In the former Case, the Vehicles Class 8 will be driven

driven against 9, that against 10, &c. of the oblique Class A 7 driven against 3, 8 against 4, &c.

By this means likewise will the Particles coalesce, and form new and larger Vesicles as before; so that their Number, which before was a Million, will now be reduced, v. g. to an Hundred thousand: But by the same Coalition, whereby their Number is diminish'd, their specifick Gravity is increased, i. e. they come to have more Matter in the same Space, or under the same Surface, as may easily be proved by Principles of Geometry.

For, in augmenting the Mass of any homogeneous Body, the Increase of Surface does not keep pace with that of the Solidity; but that of the former is as the Square of the Diameter, and that of the latter, as the Cube of the same.

If then the Diameter of a Vesicle were 4, and its Surface and Mass 24; after Coalition, if its Diameter be 6, its Surface or Bulk will be 54, and its solid Content 81. But since the same Quantity of Matter is now in a less Space, or under less Dimensions, it will lose of its Weight by the Resistance of the Medium.

This is evident, for a Body immers'd in a Fluid loses nothing of its Weight, but by the Friction of its Parts against those of the Fluid; but the Friction is evidently as the Surface: Therefore, where the Surface is lessen'd, the Resistance must be so too. Consequently the Vesicles, whose Gravity, before the Coalition, was equal to the Resistance of the Medium, now that Resistance is diminish'd, will descend, and that with a Velocity in a Ratio of the Increase of the Mass to the Increase of the Surface.

In their Descent, as they arise at denser Parts of the Atmosphere, v. g. at 4, 5, &c. their Mass and Surface again will be increas'd by new Coalitions; and thus by constant fresh Accessions, more than equal to the constant Resistances, they will be enabled to pursue their Journey, thro' all the Stages of the Air, till they reach the Earth; their Masses exceedingly magnified, and in the Form of Rain.

Now that the Vapours are got down, let us consider how the Barometer must have been affected in their Passage, ere any of the Vesicles began to subside, either from the Action of the Cold or of the Wind, they all floated in the Portion of the Atmosphere A B C D, and all gravitated towards the Center E.

Here now each respectively residing in a Part of Medium, of the same specifick Gravity with itself, will lose as much of its Weight as is equal to that of a Part of the Medium of the same Bulk with itself, i. e. each will lose all its Weight.

But then, whatever Weight each loses, it communicates to the Medium, which now presses on the Surface of the Earth A B, with its own Weight, and that of its Vesicles conjointly.

Suppose then this united Pressure keeps up the Mercury in the Barometer, at thirty Inches;

by the Coalition of the Vesicles from the Causes aforesaid, their Surfaces, and consequently their Friction, are lessen'd; they will therefore communicate less of their Weight to the Air, i. e. less than the Whole; and consequently will descend with the Excess, i. e. with a Velocity equal to the Remainder, as before observed.

Now, as the Vesicles can act no otherwise upon the Surface of the Earth A B, but by the Mediation of the interjacent Air; in Proportion as their Action on the Medium is less, their Action on the Earth will be the less.

It is also evident, that the Surface of the Earth A B, must be less pressed than before; and that in Proportion as the Vesicles reserve more of their Weight uncommunicated to the Medium, to promote their own Descent, i. e. in Proportion to the Velocity of the falling Vesicles, which is again in Proportion to their Bulks.

Thus as the Vesicles descend, their Bulks continually increasing the Friction, and therefore the Pressure on the Earth, and lastly, the Height of the Mercury, will continually decrease during the whole Time of the Fall.

Hence we see, both why the Vesicles, when once beginning to fall, persevere; why the Mercury begins to fall at the same time; and why it continues and ceases to fall together with them; which were the great *Desiderata* in the Philosophy of the Barometer.

He says, he sees but one Objection against this Theory, and that is, that the Vesicles being put in Motion, and striking against the Particles of the Medium, and one another, with some Moment, will meet with a considerable Resistance from the *vis inertiae* thereof; by which means their Descent will be retarded, and the Pressure of the Atmosphere retriev'd; the *Impetus* of the moving Vesicles being supposed to compensate for their Loss of Surface.

Thus a heavy Body sustain'd in a Fluid by a Hair, and moved up and down therein, presses more on the Bottom than when held at rest; which additional Pressure will be the greater, as the Velocity of the falling Vesicles is the greater, a greater Impulse being requir'd to break thro' the *vis inertiae* of the contiguous Particles, in a less Time than in a larger.

But there is both Reason and Experiment against this Objection; for besides that the Velocity of the Vesicles in these Circumstances must be very small, and their Impulse very inconsiderable; besides that, the *vis inertiae* of the Air must be very weak, by reason of its extreme Subtlety; and that it must be a very improper Vehicle to convey an Impulse to a Distance, by reason of its Elasticity.

We find, that even in Water (a gross, unelastick Medium) and a piece of Lead (a ponderous Body, which falls with a great Moment) that even here the Body, in its Descent thro' the Fluid, gravitates considerably less than when sustain'd at rest therein. In which the several Experiments of *Reaumer*, *Ramarini*, and *Desaguliers*, all agree.

Mr. Patrick gives us the following Rules and Observations for the Rising and Falling of the Mercury,

Mercury, in order to foreknow the Weather by the *Barometer*.

It has been observ'd, that the Motion of the Mercury does not exceed three Inches in its Rising or Falling in the *Barometer* of the common Form.

2. That its least Alterations are to be minded, in order to the right finding of the Weather by it.

3. The Rising of the *Mercury* presages in general fair Weather, and its falling foul, as Rain, Snow, high Winds, and Storms.

4. In very hot Weather, the Falling of the Mercury foreshews Thunder.

5. In Winter the Rising of the Mercury presages Frost; and in frosty Weather, if the Mercury falls three or four Degrees, there will certainly follow a Thaw; but if the Mercury rises in a *continued Frost*, it will certainly snow.

6. When foul Weather happens *soon* after the Falling of the Mercury, you may expect but little of it; and you may judge the same, when the Weather proves fair *shortly* after the Mercury has risen.

7. When the Mercury rises much and high in foul Weather, and continues so for two or three Days before the foul Weather is over, you may expect a *Continuance* of fair Weather to follow.

8. When the Mercury falls much and low in fair Weather, and continues so for two or three Days before the Rain comes, then you may expect a great deal of Wet, and probably high Winds.

9. The unsettled Motion of the Mercury, denotes uncertain and changeable Weather.

10. You are not so strictly to mind the Words engraven on the Plates, tho' for the most part it will agree with them, as the Rising and Falling of the Mercury; for if it stands at much Rain, and rises up to changeable, it presages fair Weather, altho' not to continue so long as it would have done if the Mercury were higher; and so on the contrary.

The following Rules and Observations have been made by another.

1. A still Air, clear Sky, and the Mercury falling, with a frosty Morning in *October* and *November*, indicates much Rain or Snow about to succeed, especially if the Wind be in any Point of the South.

2. If the Mercury rises very suddenly and hastily after Rain, it is generally a Sign that more Rain will succeed in a few Days, if the Wind be in any Point of the South.

3. If there be a complete Circle or Halo at a Distance from the Body of the Moon (especially if the Mercury fall) it is taken to be an infallible Sign of Rain or Snow.

4. If the Mercury falls when the Wind is full South, it is another never-failing Sign of Rain.

5. If the Mercury rises not much, or continues low after the Fall of much Rain, the Wind being in any Point of the South, you may expect a fair and clear Sky, *stante cardine*.

6. If after Rain the Wind change into any Point of the North, with a clear and dry Sky,

and the Mercury rises, it is a certain Sign of fair Weather.

7. A Continuance of fair Weather, the Wind being in the North, and the Mercury high or rising, is never succeeded by Rain till the Wind changes into some Point of the South.

8. A Continuance of Rain from the South, is scarce ever succeeded by settled fair Weather, before the Mercury rises much, and the Wind changes either to the West, or some Point of the North.

9. The Reason why the *Barometer* seems to fail, in truth, is, that in Winter time, when the Wind is in the North, and the Mercury high, a deep Snow may fall without any Alteration of the *Barometer*; but in such case it is only an Indication of very low Clouds, and a clear Atmosphere above; the Consequence of which is, the succeeding of a clear Air, and frosty Weather.

10. If in a Morning the Sky be red, with a sudden cloudy Air, or the Mercury ticks or stands with a concave Superficies, it is a sure Sign of Rain or Snow to fall that very Day.

11. If the Mercury fall suddenly in Summer, especially if the Wind be in the South, and the Air hot, heavy Rains, attended with Storm, Thunder and Lightning, commonly succeed.

12. If the Mercury subsides when the Wind is in any Point of the North, Rain is to be expected, and a great deal of Rain if the Mercury continue to subside.

13. If the Wind change into the West (as it commonly does) or some Point of the North; after there has been Rain in the South, and the Mercury rises, the Rain yet falling, you may conclude that there will be but little Rain.

14. If in fair Weather the Mercury subsides very much, and continues to do so for two or three Days before Rain comes, you may expect high Winds, and a great deal of Wet.

15. If Rain follows *immediately* upon the Subsiding of the Mercury, you need not fear much Rain.

16. It is remarkable, that most of the common and usual Signs of Rain fail during the Season of the Dog-Days, and therefore are not to be regarded while the Mercury continues high.

N.B. The Mercury will fall for a Thaw, if it is not attended with Rain if the Wind change from the North, to any Point of the South, because a Thaw is always attended with a warm Mist, and a very moist Air.

BASELLA; or Climbing Night-Shade from Malabar.

The Characters are;

It hath an annual Root: The Stalks are climbing, and of a purple Colour: The Leaves are round, thick and succulent, and of a dark green Colour: From the Foot-stalk of the Leaves are produc'd Spikes of Flowers, which are Male and Female, in different Parts of the Spike: The Female Flowers are succeeded by flat Berries, in each of which is contained one hard Seed.

There

There is but one *Specie* of this Plant, at present, known in *England*, which is

BASILLA. Hort. Mal.

This Plant must be sown early in the Spring upon a Hot-bed; and when come up, must be planted into Pots of good fresh Earth, and set into a fresh Hot-bed, in order to bring it forward; and when grown too high to be contain'd under the Glasses, may be set into the Green-house, or in some well-defended Part of the Garden, that it may ripen its Seeds. There is no great Beauty in the Flower, but for the singular Appearance of the Plant, it may deserve a Place in all curious Collections of Plants.

BASILICUM, or Basil; *vide* *Ocymum* in the Appendix.

BASONS, or Fountains, &c. which serve either for the Ornament or Use of Gardens, are made in divers Forms, some round, some oblong, or oval, others square, octangular, &c. but their most common Form is circular; and, if the Ground will permit, the larger they are, the better: and when they exceed in Size, they are called Pieces of Water, Canals, Mirrors, Fish-ponds, Pools, and Reservoirs.

In making these, Care ought to be taken to avoid both the Extremes, and not to make them either too big or too little; that a Water-work may not take up the best Part of a small Spot of Ground; nor to make too little a *Bason* in a large Spot. This must depend intirely on the Judgment of the Designer of the Garden.

Some would have the Size of a *Bason* to be proportion'd to the *Jet d' Eau*, that the Water thrown up in the Air, may not, by being blown by the Air, be carry'd beyond the Edge of the *Bason*, but all fall down without wetting the Walk.

Others again say, That let the Spout rise to never so little a Height, tho' the *Bason* be large, the Wind blow the Water to a great Distance, and tho' it be very disagreeable to see a slender Stream in a large *Bason*; and a large high Stream in a small *Bason*; and tho' there should be as great an Agreement as is possible between the Stream of the Spout and the *Bason*; yet no precise Proportion can be fix'd between the Size of *Basons* and their Spouts; because that depends upon the Fall and Force of their Water, or upon the Place where the *Fountain* is situated.

As to the Depth of *Basons*, it is usually from eighteen to twenty Inches, or twenty-four at most: This Depth being sufficient to secure the Bottom of the *Basons* from Frost and to dip Watering-pots.

But if they are to serve for *Reservoirs*, or to keep Fish in, then they may be made four or five Foot deep, which will both hold Water enough, and be deep enough for the Fish to breed in, and also to bear a Boat.

Deeper than this they need not be; and if they were deeper, they would be dangerous as to the drowning of Persons, who might chance to fall in.

In making *Basons*, great Care ought to be taken in making them at first; for the Water always naturally endeavouring to run away, and by its Weight and Pressure in a *Bason*, making its Way out at the least Cranny, it will grow constantly bigger and bigger, so that if it be not well made at first, it will be very difficult to repair it.

Basons are made either with *Clay*, *Cement*, or *Lead*; they are most usually made of *Clay*: In making such, at the marking out the Dimensions, the Diameter ought to be four Feet bigger on each Side; yet the *Bason* will not be the wider, for it will be taken up with the Walls on each Side; and the *Clay* work, which is to fill the Space between the *Bason*, must also be dug two Feet deeper than the Depth of the Water is design'd to be, because it is to be laid over eighteen Inches thick with *Clay*, and six Inches with Gravel and Paving.

The *Clay* ought to be well wrought with the Hands and Water, and when it is spread, should be trodden in with the naked Feet, that the Water of the *Bason* may not dilute through it, nor the Roots of any Trees that may grow near, may not penetrate into the outward Wall; which may be made of Shards, Rubble, or Flints, with Mortar made of the natural Earth, and is called the Ground-wall, because 'tis only made to resist the Pressure of the Ground about it. The inward Wall ought to be made with good Rubble-stones, that will not scale and come off in Flashes in the Water; or else of Flints and Stones from the Hills, which will make durable Work, but will not look so neat as the pointed Rubble; and there ought to be laid here and there Stones, the Thickness of the Wall, to render it the more substantial.

The Method of making *Basons* of *Cement* is as follows: After you have mark'd out the Dimensions of the *Bason* as before, if you enlarge it one Foot nine Inches, it will be sufficient; and the same Depth deeper at the Bottom will be enough.

This being done, you must begin to back up and raise against the Ground; cut perpendicularly a Wall of Matonry a Foot thick, which must go to the Bottom, and should be built with Shards and Rubble-stones laid in Mortar of Lime and Sand.

When the Wall is finish'd round the Circumference, then the Bottom is to be wrought a Foot thick with the same Materials; and then the solid Work or Lining of *Cement* is to be back'd up against the Walls nine Inches thick, including the Plastering and inward Surface.

This Solid ought to be made of small Flints, laid in Beds of Mortar made of Lime and *Cement*.

When this Solid is eight Inches thick, it ought to be plaister'd over the whole Surface of the Bottom with *Cement* well sifted before it be temper'd with Lime; and with this it should be wrought over smooth with the Trowel.

The Proportion of this *Cement* should be two Thirds of *Cement* or powder'd Tile to one Third of Lime.

This

This *Cement* has the Property to harden so under Water, that it will be as hard as Stone or Marble, and the Body will be so solid as never to decay.

After the finishing of the *Bason*, the Plastering should be for four or five Days successively anointed over with Oil or Bullock's Blood, to prevent it from cracking or flaking; this being done, the Water should be let into the *Bason* as soon as may be.

Those *Basons* which are made of *Lead*, are to be thus wrought: The Out-lines ought to be enlarg'd one Foot of a Side, and digg'd half a Foot deeper than the *Bason* is to be.

The Wall must be made a Foot thick, that it may be able to bear up against the Earth lying against it; but the Bottom will not require to be more than half a Foot thick.

These Walls must be built with *Rubble* laid in Mortar all of Plaster, because the Lime will eat the *Lead*; and then the *Lead* must be laid on the Walls and Bottom, and be seam'd with Solder.

But *Basons* of *Lead* are not much in Use, because of their great Charge in making, and the Danger of the *Lead* being stolen.

Great care ought to be taken to keep the upper Edge and Superficies of a *Bason* upon a Level, that the Water may cover all the Walls equally.

As for the waste Pipes of *Basons*, whether at the Bottom or Superficies, they ought not to be made too small, lest they should be choak'd, notwithstanding the Cauls that are drawn before them.

When this waste Water is only to be lost in Sinks and common Sewers, it is carry'd away in Drains or Earthen Pipes; but when it serves to play the *Basons* that lie below it, it must pass through Leaden Pipes.

BAY; *vide* *Laurus*.

BEANS.

There are four Sorts of *Beans* commonly planted in Gardens, *viz.* The small *Lisbon*, the *Spanish*, the *Sandwich* and *Windfor* *Beans*. The first and second Sorts are usually planted in *October* and *November*, under warm Walls or Hedges, to have them early; where, if they stand through the Winter, they will produce *Beans* early in the Spring: Or they may be planted close in Beds, in some Piece of Ground that is well defended from the North and East Winds; and being arch'd over with Hoops or Withies, may be cover'd, in very hard Frosts, with Mats and Straw; and in the Spring these Plants may be transplanted into warm Borders, by which means your Crop will be secur'd from Injuries of Frost; and if Care be taken in transplanting them, not to break their Roots, and also to water them, if the Season proves dry, until they have taken fresh Root, they will bear as plentiful a Crop as those which remain'd where they were at first planted, with this Difference, that they will be a Fortnight later. The *Lisbon Bean* is chiefly preferr'd to the *Spanish*; and the best way is to procure fresh Seeds from Abroad, at least every other

Year, for they are subject to degenerate in a few Years in *England*, not in Goodness, but only in their Earliness.

The *Sandwich* and *Windfor* *Beans* are seldom planted before *Christmas*, but especially the *Windfor*, which is most subject to be hurt by Cold of any of the Kinds.

These *Beans* should have an open Exposure, and require to be planted at a greater Distance than the two early Kinds; for if they are planted in shady Places, or too close, they will grow to a great Height, but seldom produce many *Beans*. The usual Distance for these (if in an open Situation) is two Foot and an half Row from Row, and four Inches in the Rows; but if the Place is closely surrounded with Hedges, Walls, or tall Trees the Distance must be greater; the Rows should then be three Foot apart, and the *Beans* six Inches distant in the Rows. The *Sandwich* *Beans* being hardier than the *Windfor*, are usually planted about *Christmas*, to succeed the forward Crops; and these although at present but in little Request, yet are very serviceable, being plentiful Bearers, and very little inferior either in Size or Goodness to the *Windfor*.

In the Middle of *January*, if the Weather is open and good, you may plant your first Crop of *Windfor* *Beans*, which will succeed the *Sandwich*, and every three Weeks make a fresh Plantation until the middle of *May*, in order to preserve a Succession through the Season: Indeed there are some People who are very fond of *Beans*, which plant even in *June*, but unless the Soil is very strong and moist, or the Season proves wet or cold, they seldom succeed well; for in hot dry Weather (which commonly happens in *July*) the Insects infest these Plants very much, and often destroy them quite, so that I have known large Quarters of *Beans* to dye away without producing one single *Bean*. There are others who advise the cutting down of *Beans*, in order to cause them to produce fresh Shoots from the Bottom for a late Crop; but this seldom answers the Trouble, for they are liable to the above-mentioned Inconveniencies much more than a fresh-planted Crop.

There is an Error very common in most Gardners, which I cant help mentioning, that is their planting of *Beans* in the Allies of their *Asparagus*-Beds, which damages the two outer Rows of the *Asparagus* much more than the Value of the *Beans*.

KIDNEY or FRENCH BEANS; *vide* *Phaseolus*.

BEAN-TREFOIL; *vide* *Cytissus*.

BEAR'S-EAR; *vide* *Auricula*.

BEAR'S EAR SANICLE; *vide* *Verbascum*.

BEAR'S-FOOT; *vide* *Helleborus*.

BECABUNGA; or Brook-lime.

This is a Sort of *Veronica* or Water-Speedwel; of which there are two Sorts; one with a long Leaf, and the other round: They are both

both very common in Ditches and watery Places almost every where in England.

BEE or GNAT-FLOWER; *vide* Orchis.

BEECH TREE; *vide* Fagus.

BELL-FLOWER; *vide* Campanula.

BELLADONA; Deadly Night-Shade.

The Characters are;

It hath a Bell-shap'd Flower consisting of one Leaf, which is divided into five acute Segments at the Top. Each of these Flowers is succeeded by a globular, soft Fruit, which is divided into two Cells, in which are lodged the Seeds.

We have but one Species of this Plant common in England, which is

BELLADONA; *majoribus foliis & floribus*. Tourn. The common Deadly Night-shade.

This Plant grows very common in many Parts of England about Farmers Yards, and in shady Lanes, but is never kept in Gardens, unless in those of Botanists; nor indeed should it be suffer'd to grow in any Places where Children resort, for it is a strong Poison, and there have been several Instances within a few Years past of its deadly Quality, by several Children being kill'd with eating the Berries, which are of a fine black Colour, and about the Size of a black Cherry, and not unpleasant to the Taste.

Mr. Ray gives a good Account of the various Symptoms it produces, by what happen'd to a Mendicant Friar upon his drinking a Glass of Mallow-wine, in which was this Plant infus'd. In a short Time he became delirious, soon after was seized with a grinning Laughter, after that, several irregular Motions, and at last a real Madness succeeded, and such a Stupidity as those that are foolishly drunk have; which after all, was cured by a Draught of Vinegar.

There is also an Instance of the direful Effects of this Plant recorded in Buchanan's History of Scotland, wherein he gives an Account of the Destruction of the Army of Sweno, when he invaded Scotland, by mixing a Quantity of the Juice of these Berries, with the Drink which the Scots by their Truce were to supply them with, which so intoxicated the Danes, that the Scots fell upon them in their Sleep, and killed the greatest Part of them, so that there was scarcely Men enough left to carry off their King.

BELLIS [is so call'd of Bellus, Lat. pretty, handsome, &c.] The Daizie.

The Characters are;

It hath a perennial Root, the Stalks are naked, and never branch out; the Calyx (or Cup) of the Flower is scaly and simple, divided into many Segments, almost to the Footstalk; the Flowers are radiated, and the Heads after the Petals are fallen off, resemble obtuse Cones.

The Species are;

1. BELLIS; *Sylvestris*; minor. C. B. The Common small Daizie.

2. BELLIS; *Sylvestris*; minor; *flore misto*. C. B. The small strip'd Daizie.

3. BELLIS; *bortensis*; *flore pleno, magno, vel parvo rubro*. C. B. The red Garden Daizie, with double Flowers.

4. BELLIS; *bortensis*; *flore pleno, magno vel parvo albo*. C. B. The white double Garden Daizie.

5. BELLIS; *bortensis*; *flore pleno, magno, vel parvo, varia ex candido & rubro*. C. B. The double strip'd Garden Daizie.

6. BELLIS; *bortensis prolifera* C. B. The Garden childing Daizie, commonly called the Hen and Chicken Daizie.

7. BELLIS; *bortensis*; *flore pleno; albo, in formam cristæ galli figurato*. The white Cockscorn Daizie.

8. BELLIS; *bortensis*; *flore pleno; rubro, in formam cristæ galli figurato*. Boerb. Ind. The red Cockscorn Daizie.

The first and second Sorts, are very common in the Meadows, almost in every Part of England: They are used indifferently in Medicine, being the same in all respects, except the Colour of the Flowers: This is also called *Consolida minima*, or the least Consound.

The different Varieties of the Garden Daizies, are propagated by parting their Roots in Autumn, and should be planted in Borders of strong Earth, which are exposed to the East; for the great Heats in Summer are very subject to destroy these Plants if they are too much exposed thereto. These Plants are pretty Ornaments to a Garden in the Spring of the Year; and may be planted for Edgings in large rural Walks in Wilderneses, where the Soil is poor, which will prevent their spreading too much, but in Parterre Gardens they should only be planted in single Roots in shady Borders, and every Year transplanted, which will preserve them in their Colours, and keep them within Compass.

BELLIS MAJOR; *vide* Leucanthemum.

BELVEDERE; *vide* Chenopodium.

BENZOIN; The Benjamin-Tree.

The Characters are;

From a Calyx, which consists of four Leaves, are produc'd three small Flowers, which have an oblong Tube; the upper Part, which is expanded, is divided into eight Segments: Between these Segments are several short Stamina or Threads; and in the Middle of the Tube is the Ovarium, which becomes the Fruit.

We have but one Species of this Plant in England, which is

BENZOIN. Boerb. Ind. *Arbor Benzoinifera*. Breyn. Prod. The Benjamin-Tree. Vulg.

This Tree was brought from Virginia into England some Years since, and was by many People kept in Green-houses as a tender Plant; but it hath been since planted into the open Ground, where it hath thriven mighty well, and is found hardy enough to resist the severest Cold of our Winters: It commonly produces its Flowers early in the Spring before the green Leaves appear, and many times will flower again in the Autumn, if the Season proves mild, but I have not seen any Fruits produc'd in England.

This

This Tree is propagated by laying down the tender Branches in the Spring of the Year; which by the succeeding Spring will have made Roots sufficient to be transplanted. The best Season for this Work is just before the green Leaves come out.

From this Tree it was formerly suppos'd that the Gum Benjamin was produc'd; but 'tis now generally otherwise believed; for that Gum is brought from the East Indies: nor is it certainly known from what Tree or Plant it is produced: And this Tree being a Native of the West Indies, if any such Gum had been produc'd from the Trees, it would have been more certainly known, and we should have been furnished from thence with the Gum long before this Time.

BERBERIS; The Barberry or Pipperidge Bush.

The Characters are;

It is set with sharp Prickles: The Leaves are oblong, and serrated on the Edges: The Flowers consist of six Leaves, which expand in Form of a Rose, and are of a yellow Colour: The Fruit is long, of an acid Taste, and for the most part of a red Colour, and grows in Clusters hanging down: The Bark of the Tree is whitish.

The Species are;

1. **BERBERIS Dumetorum**. C. B. The common Barberry.

2. **BERBERIS**; *sine Nucleo*. C. B. Barberry without Stone.

3. **BERBERIS**; *latissimo folio*; *Canadensis*. H. R. P. The broad-leav'd Canada Barberry.

4. **BERBERIS**; *fructu albo*. The white Barberry.

The first of these Sorts is very common in England, being often planted for Hedges; but the best Method to have large good Fruit, is, to plant them eight or ten Feet asunder, keeping their Middles thin and free from dead Wood; but their Fruit being for the most part produced towards the Extremity of their Branches, you should be sparing in shortning them; and when this is done, it should be at Michaelmas, when their Leaves begin to decay.

The second Sort, I believe to be only an accidental Variety of the first; for young Plants taken from old Trees, which produce Fruits without Stone, are rarely found to prove right; and it hath been observ'd, that none but old Trees produce their Fruits so, nor are all the Fruits upon the same Tree without Stones. That Sort with white Fruit seems not to differ from the common, except in the Colour of the Fruit.

The Canada Barberry hath been of late Years introduc'd amongst us. The Leaves of this Tree are larger than those of the common Sort; but how its Fruit differs from the common I can't at present say, having not seen any produc'd in England, although the Tree is equally as hardy as the common Sort.

These are all propagated from Suckers taken from Roots of the old Plants, which generally furnish them in abundance: Or they may be

rais'd from Seeds, or by laying down their Branches, which will in one Year take sufficient Root to be transplanted: They delight in a strong loamy Soil, and may be planted either in October or February.

BETA; The Beet.

The Characters are;

It hath a thick fleshy Root: The Flowers have no visible Leaves, but have many Stamina or Threads, which are collected into a Globe: The Cup of the Flower is divided into five Segments: The Seeds are covered with a hard outer Coat, and grow two or three together in a Bunch.

The Species are;

1. **BETA**, *alba*; *vel pallescens quæ Cicla officinarum*. C. B. The common white Beet.

2. **BETA**, *communis*; *sive viridis*. C. B. The common green Beet.

3. **BETA**, *rubra*; *vulgaris*. C. B. The common red Beet.

4. **BETA**, *rubra*; *radice Rapæ rotundæ*. Boerb. Ind. The Turnip-rooted red Beet.

5. **BETA**, *rubra*, *major*. C. B. The great red Beet.

6. **BETA**, *lutea*, *major*. C. B. P. The yellow Beet.

7. **BETA**, *maxima*; *Helvetica*, *latissimo caule*. Boerb. Ind. The Swiss or Chard Beet.

The two first mentioned are preserved in Gardens for the Use of their Leaves in Pot-herbs, but at present they are not so much esteem'd as they have been, and are but in few Gardens: The other Sorts are propagated for their Roots, which, in Winter, are boil'd as Parsnips, &c. and serv'd up to Table, and are by many greatly esteem'd: The Red Beet is the most commonly cultivated, and is often used to garnish Dishes withal: The Swiss Beet is by some very much esteem'd: The large flat Ribs of the Leaves are stew'd, and afterwards fry'd in Butter, which is accounted by many a delicate Dish.

These Beets are all propagated by sowing their Seeds in February or March, in a deep loose Soil (but not over dung'd) and must be hoed out after they are come up, so as to leave them ten or twelve Inches asunder, for they spread very much, and if they have not Room their Roots will be very small. The Gardeners near London, in order to make the most of their Ground, sow these Beets with Carrots upon the same Ground, and draw off their Carrots in the Summer-time for the Market before the Beets have grown very large; and when the Carrots are gone there will be Room for the Beets to grow, so that they have a double Crop: and if their Beets should happen to fail, they plant a Crop of Savoys for the Winter, so that their Ground seldom lies idle.

BETONICA, [alias *Vetonica*, of the *Vetones*, an ancient people of Spain, who first found this Plant.] Betony.

The Characters are;

The Leaves are green, rough and crenated on the Edges: The Flowers are disposed in a Spike: The

The upper Crest of the Flower is advanc'd and divided into two Segments; the Beard or lower Part of the Flower is divided into three; and the middle Segment is bifid; each Flower is for the most part succeeded by four naked Seeds.

There are several Species of this Plant cultivated in Botanick Gardens; but as their Use and Beauties are not sufficient to recommend them to the Curious, so I shall pass them over with only mentioning the common Sort which is used in Medicine.

BETONICA; *purpurea*. C. B. The Common or Wood Betony.

This Plant is very common in Woods and shady Places in most Parts of England: It may be propagated in shady Borders in a Garden, by either sowing the Seeds in Spring, or by parting the Roots, which may be taken out of the Woods: The Soil should be rather moist than dry, and not over rich.

BETONICA AQUATICA; *vide* Scrophularia.

BETONICA PAULI; *vide* Veronica.

BETULA. The Birch-Tree.

The Characters are;

The Leaves are like those of the Poplar; the Shoots are very slender and weak; the Juli or Catkins are produced at remote Distances from the Fruits on the same Tree; the Fruit becomes a little squamose Cone; the Seeds are wing'd, and the Tree casts its outer Rind every Year.

We have but one Species of this Tree in England, which is,

BETULA. Dod. The Birch-Tree.

This Tree is propagated by Suckers taken from the Roots of old Trees, which may be transplanted either in October or February: It delights in a poor Soil, and will grow in either moist springy Soils, or in stony or gravelly Marshes, or Bogs: When the young Trees have been planted one Year, you should (if design'd for Underwood) cut them down within six Inches of the Surface, which will cause them to shoot out strong and vigorous Branches; but if they are design'd for large Trees, it will be much better to let them stand two Years before you head them down; and when you do it, cut them within three Inches of the Ground, that their Stems may be strait and handsome: but you must observe, when they begin to put out, whether they produce more than one Shoot; which if they do, you must rub off all but the strongest and most convenient Shoot which must be train'd up for a Stem.

The Timber of this Tree, tho' accounted the worst of all others, yet is not without its various Uses: The Turners often use it to make Chairs, &c. and the Husband-man for making Ox-yoaks; it is also planted for Hop-poles, Hoops, &c. but in Places within twenty Miles of London, it is kept often cut to make Brooms, and turns to great Account.

BIDENS; Water-Hemp Agrimony.

We have two or three Varieties of this Plant growing wild in England, but as they are

neither useful, nor of any Beauty, so I shall pass them over in this Place.

BIFOLIUM; Twyblade.

This Plant grows wild in moist Meadows in divers Parts of England; it rises in May, and flowers in June, and soon after dies away. This Plant is of no Use or Beauty.

BIGNONIA; [M. Tournefort call'd this Plant *Bignonia*, in Memory of Abbot Bignon, Librarian to Lewis XIV. King of France, he being a great Encourager of Learning.] The Trumpet Flower or Scarlet Jasmine.

The Characters are;

It hath a tubulous Flower, consisting of one Leaf, which opens at the Top like two Lips: These Flowers are succeeded by Pods, which are divided into two Cells, and contain several wing'd Seeds.

The Species are;

1. **BIGNONIA**; *Americana*; *Fraxini folio*; *flore amplo Phœuicio*. Tourn. The Scarlet Trumpet Flower; *vulgô*.

2. **BIGNONIA**; *Americana*; *capreolis donata*; *siliquâ breviori*. Tourn. The four-leav'd Dwarf Trumpet-Flower; *vulgô*.

3. **BIGNONIA**; *Americana*; *Arbor*; *flore luteo*; *Fraxini folio*. Plum. The large yellow Trumpet-Flower; *vulgô*.

4. **BIGNONIA**; *Americana*; *Arbor*; *Syringæ Cæruleæ foliis flore purpureo*. Catesb. The blue Trumpet-Flower, or Cattalpa.

The Sort first mentioned is common in several curious Gardens near London, and is planted against Walls expos'd to the South Sun, where it thrives and produces large Quantities of Flowers annually but it requires a great deal of Room, for it is a large Shooter; and the Flowers being always produc'd at the extreme Parts of the same Year's Shoots, if these are stopp'd, the Flowers are taken off; but in the Spring the young Branches may be shortned to three or four Eyes, as in Vines, and the small weak Shoots taken out, leaving the large ones twenty Inches or two Feet asunder: These Branches strike Roots into the Walls, by which they are secur'd, and require very little Assistance in nailing them up.

The third Sort is scarce in England at present: This is a Tree of large Growth in the warm Parts of America, but being tenderer than the other Sorts, requires to be kept in a Stove in England.

The fourth Sort was brought from the Bahama Islands by Mr. Catesby a few Years since: It hath not, as yet, produc'd any Flowers in England, but is very hardy, and grows to be a handsome upright Tree: The Leaves are very like those of the Lilac, but somewhat larger. These Trees are all of them propagated by laying their Branches, or from Suckers, (which in the two first Sorts are produc'd in great Plenty); and sometimes the Cuttings will take Root, tho' not very often. The best Season for transplanting these Trees, is in the Spring, after the cold Weather is past. They delight in a dry sandy Soil.

BIND-

BINDWEED; *vide* Convolvulus.

BIRCH-Tree; *vide* Betula.

BISLINGUA; *vide* Ruscus.

BISTORTA; [so call'd, because the Root is turn'd or wreath'd into various Rings or Spires.] Bistort or Snake-weed.

There are there or four Varieties of this Plant which are found wild in *England*, but as they are seldom planted in Gardens, so I shall pass them over with only mentioning the common Sort which is used in Medicine.

BISTORTA; *major*; *radice minus intortâ*. C. B. The common great Bistort, or Snake-weed.

This Plant flowers in *May*, and if the Season proves moist, will continue to produce new Spikes of Flowers till *August*. It may be propagated by planting the Roots in a moist shady Border, either in Spring or Autumn, and will soon furnish the Ground with Plants; for it greatly increases by its creeping Roots.

BIVALVULAR, or *Bivalve*, (of *Bivalvis*) Husk; is one that opens or gapes the whole Length, like a Door that opens in two Parts.

BLADDER-NUT; *vide* Staphylloden-dron.

BLATTARIA; [takes its Name of *Blatta*, *Lat.* a Moth or Worm, because this Plant kills those Animals that gnaw Books] Moth-Mullein.

The Characters are;

The Leaves are plac'd alternately upon the Branches: The Cup of the Flower consists of one Leaf, which is divided into five Segments: The Flowers consist of one Leaf, which spreads open, and is divided also into five Segments: They are produc'd in long Spikes, and are succeeded by round Vessels, which are divided into two Cells, and contain many small Seeds in each.

The Species are;

1. **BLATTARIA**; *lutea*. J. B. The yellow Moth-Mullein.

2. **BLATTARIA**; *alba*. C. B. The white Moth-Mullein.

3. **BLATTARIA**; *flore roseo*, Boer. Ind. The Rose-colour'd Moth-Mullein.

4. **BLATTARIA**; *purpurea*. C. B. The Purple Moth-Mullein.

5. **BLATTARIA**; *perennis*, *folio Verbasci*: *flore luteo amplo*. Mor. Hist. The perennial Moth-Mullein, with large yellow Flowers.

There are several other Varieties of this Plant, which are preserv'd in the curious Gardens of the Botanists; but these mention'd are some of the most beautiful, and are worthy preserving in all curious Gardens, except the first, which is a spontaneous Plant in *England*; for which Reason I plac'd it here in the Front to introduce the rest.

The three first mention'd are biennial Plants, never standing more than two Years, and sometimes but one: They must be sown in the Spring; and when they are come up, may

be transplanted where they are to remain for good. If any of these Plants shoot up to flower the first Year, the Winter will destroy them, but those that are backward will endure our severest Winters, provided they are planted on a dry rubbishy Soil, and the next Spring will flower and produce good Seeds.

The fourth and fifth Sorts are Perennials, their Roots abiding several Years in the Ground: These are also rais'd by sowing their Seeds; for their Roots do seldom part well, and the often removing them prevents their flowering strong. All these Sorts delight in a dry, poor, stony, or gravelly Soil, and are often found growing upon old Walls and Buildings.

BLIGHTS.

There is nothing so destructive to a Fruit-Garden as *Blights*; nor is there any thing in the Business of Gardening which requires more of our serious Attention than the endeavouring to prevent or guard against this great Enemy of Gardens.

In order therefore to remedy this Evil, it will be necessary first to understand the true Causes of *Blights*: And altho' many curious Persons have attempted to explain the Causes of them, yet very few of them have yet come near the Truth, except the Reverend and Learned Mr. Hales, who hath, in his curious Book, intitled, *Vegetable Staticks*, given us some accurate Experiments upon the Growth and Perspiration of Plants; together, with the various Effects the Air hath upon Vegetables, that by carefully attending thereto, together with diligent Observations, we need seldom to be at a Loss how to account for the Causes of *Blights* whenever they may happen.

But here I can't help taking Notice of the several Causes of *Blights*, as they have been laid down by some of our modern Writers on Gardening; together, with their various Methods prescrib'd to prevent their Destruction of Fruits, &c.

Some have suppos'd, that *Blights* are usually produc'd by an Easterly Wind, which brings vast Quantities of Insects Eggs along with it from some distant Place, which being lodg'd upon the Surfaces of the Leaves and Flowers of Fruit-Trees, cause them to shrivel up and perish. To cure this Distemper, they advise the burning of wet Litter on the Wind-ward Side of the Trees, that the Smoak thereof may be carried to them by the Wind, which they suppose will stifle and destroy these Insects, and thereby cure the Distemper.

Others direct the Use of Tobacco-dust; or to wash the Trees with Water wherein Tobacco-stalks have been infus'd for twelve Hours; which they say will destroy these Insects, and recover the Trees: And Pepper-dust scatter'd upon the Blossoms of Fruit-Trees, has been recommended as very useful in this Case: And there are some that advise the pulling off the Leaves of the Tree, as the best Remedy, when they are shrivel'd up and wither, and to cut off the smaller Branches when they produce crooked and unnatural Shoots, and to sprinkle the

the Tree with a Watering-Pot or a Hand-Engine.

These Conjectures concerning *Blights*, how specious soever they may appear at first Sight, yet, when duly consider'd, will be found far short of the true Cause, as will hereafter be shewn.

Some there are who imagine the most destructive *Blights* which attend Fruit-Trees, are produc'd by small Showers of Rain, or white Hoar-Frosts falling upon the Blossoms of Fruit-trees, which being succeeded by cold North or Easterly Winds, or frosty Mornings, are the Occasion of the frequent *Blights* which happen in the Spring Season: To prevent this Mischief, it hath been recommended by a late learned Author, to build new Walls; in which, at every third Course of Bricks, should be laid a Row of plain Tiles, which should project forward, and hang over the Plain of the Wall above an Inch and an half, to carry off the perpendicular Dews and Rains, leaving Room, at Distances, between the Tiles to carry up the Branches of the Tree. This Method is so positively laid down, as a great Advantage for the more certain obtaining of Fruit, by a Gentleman whose Profession should incline him to Modesty, especially when he was not sure of his Facts, that I can't pass it over without some Animadversions.

1. He says, That these horizontal Shelters will be of Advantage, even in the most difficult Years, to preserve the Fruit, so that a good Quantity of it may be almost depended on from such Branches and Blossoms as were shelter'd by the Tiles, as he himself had often experienc'd.

As to this first Article, I need say no more than what Mr. Collins hath already written, viz. That this Reverend Gentleman acknowledg'd to him, at least a Year after his Book was printed, that he never had any Walls of that kind; but that, a few Days before this Visit, he had stuck a few Pieces of Tiles and Oyster-shells into a Mud-wall at particular Places over some Bunches of Blossoms with Mortar, which was not dry at that time; which he declar'd was his first Essay: Now how a Gentleman of his Character can answer the advising of Persons to put themselves to such an extravagant Expence as the building of new Walls for Fruit, with an Assurance of Success, when it was only a simple Imagination of his own, without so much as a single Experiment to support it, I am wholly at a Loss to know?

But let us proceed to his second Article, in which he says, That Fruit thus shelter'd, will be larger, better fed, and finer tasted than those on the same Tree, which are more expos'd. This every one, who hath ever made any Observations on the different Taste, Size, Colour, or Goodness of Fruits which grew on different Parts of the same Tree, will, upon the first reading, condemn as false; for let us only observe such Fruits as are sometimes produc'd between the Wood-branches and the Wall, and are by them depriv'd of the Advantage of a free open Air, so that they cannot imbibe the kindly Dews, or other aerial Par-

ticles of Nourishment, nor can they so freely expire or throw off any of those crude watery Particles which were convey'd through the Branches of the Tree to the Fruit, and we shall find that it never arrives to half its Magnitude, and is always tough, watery and insipid, especially in *Peaches*. This is much the same with his horizontal Shelters; for the Rows of Tiles being plac'd in every third Course of Bricks, will effectually keep off all Dews and Rain from the Fruits, Leaves, and Branches; both of which is by every one allow'd to be absolutely necessary and serviceable in the Business of Vegetation.

As to his third Article (*viz.*) that the Fruit will be much earlier ripe, I am very ready to subscribe to it; for let us but observe such Trees or Parts of Trees, as are in a decaying State, and are not capable of affording proper Nourishment to the Fruit, and we shall always find these Fruits will be the first ripe; but how good they will be, either as to Size or Flavour, I shall submit to every one's Judgment that knows but the least of this Matter.

In his fourth Article he says, that Walls built with these Rows of Tiles, will effectually cure that common Mistake of leading Wood-Branches perpendicularly. This I believe to be true, for a Wall built in this Manner, and well planted with Fruit-trees, will, in less than seven Years, have no Wood-Branches left alive to train either horizontally or perpendicular; as I can positively affirm was the Case, with a Wall built after his Directions within my own Observation.

But let us now examine the true Causes of *Blights*, so far as we have been enabled to judge from repeated Observations and Experiments.

1. *Blights* then are often caus'd by a continu'd dry Easterly Wind, for several Days together, without the Intervention of Showers, or any Morning Dew, by which the Perspiration in the tender Blossoms is stopp'd, so that in a short Time their Colour is chang'd, and they wither and decay: And if it so happens that there is a long Continuance of the same Weather, it equally affects the tender Leaves, for their perspiring Matter is hereby thickned, and render'd glutinous, closely adhering to the Surfaces of the Leaves, and becomes a proper Nutriment to those small Insects which are always found preying upon the Leaves and tender Branches of Fruit-trees, whenever this *Blight* happens; but it is not these Insects which are the first Cause of *Blights*, as hath been imagin'd by some; tho' it must be allowed, that whenever these Insects meet with such a proper Food, they multiply exceedingly, and are instrumental in promoting the Distemper; so that many times when the Season proves favourable to them, and no proper Care hath been taken to prevent their Mischief, it is surprizing to think how whole Walls of Trees have suffered by this Infection.

The best Remedy for this Distemper that I have yet known succeed, is, gently to wash and

and sprinkle over the Trees from time to time with common Water (that is, such as hath not had any Thing steep'd in it) and the sooner this is perform'd (whenever we apprehend Danger) the better, and if the young and tender Shoots seem to be much infected, wash them with a woollen Cloth, so as to clear them, if possible, from all this glutinous Matter, that their Respiration and Perspiration may not be obstructed; and if we place some broad flat Pans or Tubs of Water near the Trees, that the Vapours exhaled from it may be received by the Trees, it will keep their tender Parts in a ductile State, and greatly help them; but whenever this Operation of washing the Trees is perform'd, it should be early in the Day, that the Moisture may be exhal'd before the Cold of the Night comes on, especially if the Nights are frosty; nor should it be done when the Sun shines very hot upon the Wall, which would be subject to scorch up the tender Blossoms.

Another Cause of *Blights* in the Spring is sharp hoary Frosts, which are often succeeded by hot Sun-shine in the Day Time, which is the most sudden and certain Destroyer of Fruits that is known; for the Cold of the Night starves the tender Parts of the Blossoms, and the Sun rising hot upon the Walls before the Moisture is dry'd from the Blossoms, (which being in small Globules, doth collect the Rays of the Sun,) a scalding Heat is thereby acquired, which scorches the tender Flowers and other Parts of Plants.

But that *Blights* are frequently no more than an inward Weakness or Distemper in Trees, will evidently appear, if we consider, how often it happens that Trees against the same Wall expos'd to the same Aspect, and equally enjoying the Advantages of Sun and Air, with every other Circumstance which might render them equally healthy, yet very often are observ'd to differ greatly in their Strength and Vigour; and as often do we observe the weak Trees to be continually blighted, when the vigorous ones in the same Situation shall escape very well; which must therefore, in a great measure, be ascribed to their healthy Constitution: This Weakness therefore in Trees, must proceed either for want of a sufficient Supply of Nourishment to maintain it in perfect Vigour, or from some ill Qualities in the Soil where it grows, or perhaps from some bad Quality in the Stock, or inbred Distemper of the Bud or Cyon, which it had imbibed from its Mother Tree, or from Mismanagement in the Pruning, &c. all which are productive of Distempers in Trees, and which are with Difficulty cured thereof. Now if it was occasion'd by a Weakness in the Tree, we should endeavour to trace out the true Cause, first, whether it has been occasion'd by ill Management in their Pruning, which is too often the Case, for how common is it to observe *Peach-trees* train'd up to the full Length of their Branches every Year, so as to be carried to the Top of the Wall in a few Years after planting, when at the same Time the Shoots have been so weak, as scarce-

ly to have Strength to produce their Flowers; but this being the utmost of their Vigour, the Blossoms fall off, and many Times the Branches decay, either the greatest Part of their Length, or quite down to the Place where they were produced; and this, whenever it happens to be the Case, is ascribed to a *Blight*.

Others there are who suffer their Trees to grow just as they are naturally disposed during the Summer Season, without stopping of Shoots, or disburdening their Trees of luxuriant Branches, by which means, two, three, or four Shoots shall exhaust the greatest Part of the Nourishment of the Trees all the Summer, which Shoots, at the Winter Pruning, are intirely cut out, so that the Strength of the Tree was employed only in nourishing useless Branches, while the Fruit Branches are thereby render'd so weak, as not to be able to preserve themselves: The Remedies to this Evil shall be explain'd in the Article of *Pruning Peach Trees*, &c.

But if the Weakness of the Tree proceeds from an inbred Distemper, it is the better way to remove the Tree at first, and after renewing your Earth, plant a new one in its Place.

Or if your Soil is a hot burning Gravel or Sand, in which your Peach Trees are planted; you'll generally find this will be constantly their Case after their Roots have gotten beyond the Earth of your Borders, for which Reason it is much more advisable to dig them up, and plant *Grapes*, *Figs*, *Apricots*, or any other Sort of Fruit which may do well in such a Soil, than to be annually disappointed of your Hopes: For by a Variety of Experiments, it hath been found, that *Apricots* do attract and imbibe Moisture with a much greater Force than *Peaches* and *Nectarines*, and so consequently are more capable to assimilate their nutritive Particles from the Earth, than the other can do, which require to be planted in a generous Soil, which can afford them a Sufficiency of Nourishment without much Difficulty: And it is in such Places we often see *Peaches* do Wonders, especially if assisted by Art; but as for the *Vine* and *Fig-tree*, they perspire but very slowly, and are very often in an imbibing State (so that a great Part of that fine racy Flavour, with which their Fruits abound when planted in a dry Soil, is probably owing to those refined aerial Principles which are collected when in a State of Respiration); and therefore, as these Trees do not delight in drawing much watry Nourishment from the Earth, so they will much better succeed in such a Soil than in one that is more generous; we should therefore always endeavour to suit the particular Sorts of Fruits to the Nature of our Soil, and not pretend to have all Sorts of Fruit good in the same Soil.

But there is another Sort of *Blight*, against which it is very difficult to guard our Fruit-trees; this is sharp pinching frosty Mornings, which often happen at the Time when the Trees are in flower, or while the Fruit is very young, and occasions the Blossoms or Fruit to drop off, and sometimes the tender

Parts

Parts of the Shoots and Leaves are greatly injur'd thereby.

The only Method yet found out to prevent this Mischief is, by carefully covering the Walls, either with Mats, Canvas, &c. which being fastened so as not to be disturb'd with the Wind, and suffered to remain on during the Night, by taking them off every Day, if the Weather permits, is the best and surest Method that hath yet been used in this Case; which altho' it has been slighted and thought of little Service by some, yet the Reason of their being not so serviceable as has been expected, was, because they have not been rightly used, by suffering the Trees to remain too long covered, by which Means the younger Branches and Leaves have been rendred too weak to endure the open Air when they are expos'd to it, which has often proved of worse Consequence to Trees than if they had remain'd intirely uncovered.

Whereas, when the Covering before mentioned has been performed as it ought to be, it has proved very serviceable to Fruits; and many times, when there has been almost a general Destruction of Fruits in the neighbouring Gardens, there has been a Plenty of them in such Places where they have been covered: And tho' the Trouble may seem to some to be very great, yet if these Coverings are fix'd near the Upper-part of the Wall, and are fastened to Pullies, so as to be drawn up or let down, it will be soon and easily done, and the Success will sufficiently repay the Trouble.

But there is another Sort of *Blight* that sometimes happens later in the Spring, viz. in *April* or *May*, which is often very destructive to Orchards and open Plantations, and against which we know of no Remedy. This is what is call'd a *Fire Blast*, which in a few Hours hath not only destroy'd the Fruit and Leaves, but many times Parts of Trees, and sometimes whole ones have been kill'd by it.

This is supposed to be effected by Volumes of transparent flying Vapours, which among the many Forms they revolve into, may sometimes approach so near to a *Hemisphere*, or *Hemicylinder*, either in their upper or lower Surfaces, as thereby to make the Beams of the Sun converge enough to scorch the Plants or Trees they fall upon, in Proportion to the greater or less Convergency of the Sun's Rays.

The learned *Boerhaave*, in his Theory of *Chymistry*, observes, "That those white Clouds which appear in Summer-time, are, as it were, so many Mirrors, and occasion excessive Heat; these cloudy Mirrors are sometimes Round, sometimes Concave, Polygonous, &c. When the Face of the Heavens is covered with such white Clouds, the Sun shining among them must of Necessity produce a vehement Heat, since many of his Rays, which would otherwise, perhaps, never touch our Earth, are hereby reflected to us; Thus, if the Sun be on one Side, and the Clouds on the opposite one, they will be perfect Burning Glasses: And hence the Phenomena of Thunder.

"I have sometimes, *continues he*, observ'd a kind of hollow Clouds, full of Hail and Snow, during the Continuance of which the Heat was extreme, since by such Condensation they were enabled to reflect much more strongly: After this came a sharp Cold, and then the Clouds discharg'd their Hail in great Quantity, to which succeeded a moderate Warmth. Frozen Concave Clouds therefore, by their great Reflections, produce a vigorous Heat, and the same, when resolv'd, excessive Cold."

Whence (as Mr. *Hales* observes) we see, that Blasts may be occasion'd by the Reflections of the Clouds, as well as by the above-mentioned Refraction of dense transparent Vapours.

Against this Enemy to Fruits, &c. as hath been said, there is no Guard to our Plantations, nor any Remedy to cure it; but as this more frequently happens in close Plantations, where the stagnating Vapours from the Earth, and the plentiful Perspirations from the Trees, are pent in for want of a free Air to dissipate and dispel them, which are often observ'd in still Weather to ascend in so plentiful a manner as to be seen by the naked Eye, but especially with reflecting Telescopes, so as to make a clear and distinct Object become dim and tremulous, than in those that are planted at a greater Distance, or are not surrounded with Hills or Woods. This directs us, in the first planting of Orchards, &c. that we should allow a greater Distance between the Trees, and to make choice of clear, healthy Situations, that the Air may freely pass between the Trees to dissipate those Vapours before they are formed into such Volumes, whereby the circumambient Air will be clear and less subject to such Injuries, as also the Fruits which are produced in this clearer Air will be much better tasted than those that are surrounded with a thick rancid Air; for as Fruits are often in a respiring State, so they consequently, by imbibing a part of these Vapours, are rendred crude and ill-tasted; which is often the Case with a great part of our Fruits in *England*.

BLOODWORT; *vide* *Lapathum* in the Appendix.

BONUS HENRICUS; *vide* *Chenopodium*.

BORDERS: The Use of these in a Garden is to bound and inclose *Parterres*, to prevent them being injur'd by walking in them: These are commonly render'd very ornamental by means of the Flowers, Shrubs, &c. that are planted in them.

These ought to be laid with a Rising in the Middle, because if they are flat, they are not agreeable to the Eye.

As for their Breadth, five or six Feet are often allow'd for the largest, and four for the lesser.

Borders are of four Sorts; and those are the most common that are continu'd about *Parterres* without any Interruption, and are wrought with a sharp Rising in the Middle like an Ass's Back, and planted with low Shrubs and Flowers.

The

The second Sort of *Borders* are such as are cut into Compartments at convenient Distances by small Passages; and being also rais'd in the Middle, as before mentioned, are likewise set off with Shrubs.

The third Sort are such as are laid even and flat, without Flowers, having only a Verge of Grass in the Middle, being edg'd with two small Paths rak'd smooth and sanded: These are sometimes garnish'd with flowering Shrubs and Flowers of large Growth, or with Vases and Flower-pots plac'd regularly along the Middle of the Verge of Grass.

The fourth Sort are quite plain, and are only sanded, as in the *Parterres* of *Orangery*, and are filled with Cases rang'd in a regular Order along those *Borders* which are edg'd with Box on the Sides next to the Walks, and on the other, with Verges and Grass-work next the *Parterre*: Sometimes a Yew is planted between each Case, which makes the *Border* appear richer, and the *Parterres* handsomer during the Winter Season.

Borders are made either strait, circular, or in Cants, and are turn'd into Knots, Scrolls, Volutes, and other Compartments.

Florists do also make *Borders* either along Walks or detach'd, and in these they raise their finest and choicest Flowers: These are frequently encompass'd with Border-boards painted Green, which makes them look exceeding neat.

But in large *Parterres* this is not to be expected; which if they be stock'd with Flowers, succeeding one another in their several Seasons, it is sufficient, so that nothing appears bare and naked.

It is usual to discontinue the *Borders* at the Ends next to the House, that the Embroidery and Rise of the *Parterre* may not be hidden by the Shrubs and flowering Plants, and that the Design may be better judged of.

And sometimes there are branch'd out of it Foliage, Palm-leaves and Shells sporting among the Sands.

BORRAGO; [or *Borago*, which signifies much the same as *Courage*, because it is so good a Raifer of the Spirits.] *Bor-rage*.

The Characters are;

The Leaves are broad and rough; the Flowers consist of one Leaf, are of a Wheel-shape, and divided into five Segments almost to the Bottom, which end in sharp Points like a Star; the Apices in the Middle of the Flower are sharp-pointed, and adhere together; the Seeds are rough, and appear like a Viper's Head.

The Species are;

1. **BORRAGO**; *floribus caeruleis*. *J. B.* The common *Bor-rage*, with blue Flowers.

2. **BORRAGO**; *flore palléscente, rosco aut suave-rubente*. *Tourn.* The common *Bor-rage*, with a pale Rose-colour'd Flower.

3. **BORRAGO**; *floribus albis*. *J. B.* The common *Bor-rage*, with a white Flower.

The first Sort is very common in all Parts of England, being often found upon Dung-hills, and in publick Roads, where the Seeds have

been scattered from Gardens, but is hardly a Native Plant of our Island; however, it is so far naturalized amongst us, that where-ever it is suffered to stand till its Seeds are dropt upon the Ground, there will always be a plentiful Crop.

The Seeds of this Plant may be sown in the Spring; it will grow in almost any Soil, but best in that which is dry. This Plant is often used in the Kitchen, and for cool Tankards in Summer-time, and the Flowers are used in medicinal Cordials.

The White and Rose-coloured Flowers are accidental Varieties of the common Sort; but the Seeds of either Sort being sown separately, will produce some Plants of the same kind.

BOSQUETS; are Groves, so call'd from *Bouquet*, in *French*, i. e. a Nosegay.

These are small Compartments of Gardens, which are form'd of Trees, Shrubs, or tall large growing Plants, planted in Quarters, and are either dispos'd regularly in Rows, or in a more wild or accidental manner, according to the Fancy of the Owner: These Quarters are commonly surrounded with ever-green Hedges, and the Entrances form'd into regular Portico's with Yews, which are by far the best, and most useful Trees for this Purpose. In the Inside of these Quarters may be made some Walks, either strait or winding; which, if the Quarters are large, should be six or eight Feet broad, and may be laid with Turf, and kept well mow'd and roll'd, which will render the walking much easier and pleasanter than if the Walks are only the common Earth, which in smaller Quarters can't be otherwise; for if the Trees are close, and the Walks narrow, so as to be shaded and over-hung by the Trees, the Grass will not grow.

These Quarters may be also surrounded with Hedges of *Lime*, *Elm*, *Hornbeam*, or *Beech*; which should be kept well shear'd, and not suffered to rise too high; that the Heads of the Trees may be fully seen over them, and the Stems only hid from the Sight, when in the Walks on the Outside of the Quarters.

In the planting of these *Bosquets*, you should observe to mix the Trees, which produce their Leaves of different Shapes, and various Shades of Green, and hoary or mealy Leaves, so as to afford an agreeable Prospect; besides, there are a great Variety of different Fruits which these Trees produce in Autumn, which altho' of little or no Use, that we know of, yet have a very good Effect, in affording an agreeable Variety for some Time after the Leaves are gone; as the *Euonymus* or *Spindle-Tree*, the *Opulus* or *Marsh-Elder*, the *Cock-Spur Hawthorn*, with many other Sorts, too many to mention in this Place: But I would advise never to mix Ever-greens with deciduous Trees; for besides the ill Effect it hath to the Sight, (especially in Winter) they seldom thrive well together; so that those Quarters where you intend to have Ever-greens, should be wholly planted therewith; and in the other Parts, mix as many Varieties of different Trees which cast their Leaves, as you can

conveniently ; and also plant some of the largest growing Flowers, (especially near the Outside of the Quarters) which will add greatly to the Variety, if they have but Air enough to grow.

These *Bosquets* are proper only for spacious Gardens, being expensive in their first making, as also in keeping.

BOTRYS ; *vide* *Chenopodium*.

BOX TREE ; *vide* *Buxus*.

BRANCA URSINA ; *vide* *Acanthus*.

BRASICA. The Cabbage.

The Characters are ;

The Leaves are large, fleshy, and of a glaucous Colour ; the Flowers consist of four Leaves, which are succeeded by long Taper Pods, containing several round acrid Seeds.

The Species are ;

1. **BRASICA** ; *Capitata* ; *alba*. C. B. The common white Cabbage.

2. **BRASICA** ; *Capitata* ; *rubra*. C. B. The red Cabbage.

3. **BRASICA** ; *Capitata* ; *alba* ; *minor* ; *Muscovitica*. H. A. The Russian Cabbage.

4. **BRASICA** ; *Capitata* ; *alba* ; *compressa*. Boerb. Ind. The flat-sided Cabbage.

5. **BRASICA** ; *Capitata* ; *alba* ; *pyramidalis*. The Sugar loaf Cabbage.

6. **BRASICA** ; *Capitata* ; *alba* ; *præcox*. The early Battersea Cabbage.

7. **BRASICA** ; *Sabauda* ; *Hyberna*. Lob. Ic. The white Savoy Cabbage.

8. **BRASICA** ; *Capitata* ; *viridis* ; *Sabauda*. Boerb. Ind. The green Savoy Cabbage.

9. **BRASICA** ; *fimbriata*. C. B. The Boor Cole.

10. **BRASICA** ; *Capitata* ; *virescens* ; *Italica* ; *Crispa*. Munt. Hist. The green Broccoli.

11. **BRASICA** ; *Italica* ; *Broccoli dicta*. The Italian Broccoli.

12. **BRASICA** ; *radice Napiformi*. Tourn. The Turnip-rooted Cabbage.

13. **BRASICA** ; *Cauliflora*. C. B. The Cauliflower.

There are several other Varieties of Cabbages which are preserv'd in curious Botanick Gardens, which differ in their Manner of Growth, Colour, &c. But those I have mention'd being the principal Sorts which are cultivated for Use, I shall omit mentioning the other less valuable Sorts in this Place, and proceed to their Culture.

The common white, red, flat, and long-sided Cabbages are chiefly cultivated for Winter Use: The Seeds of these Sorts must be sown in the middle of *March*, in Beds of good fresh Earth, and in *April*, when the young Plants will have about eight Leaves ; they should be prick'd out into shady Borders, about three Inches square; that they may acquire Strength, and to prevent their growing long-shank'd.

About the Middle of *May*, you must transplant them out, where they are to remain for good, (which in the Kitchen-Gardens near *London*, is commonly between *Colliflowers*, *Artichokes*, &c. at about two Feet Distance in

the Rows) ; but if they are planted, for a full Crop in a clear Spot of Ground, the Distance from Row to Row should be three Feet, and in the Rows two Feet four Inches asunder : If the Season should prove dry when they are transplanted out, you must water them every other Evening until they have taken fresh Root ; and afterwards, as the Plants advance in Height, you should draw the Earth about their Stems with a Hoe, which will keep the Earth moist about their Roots, and greatly strengthen the Plants: You must also observe to keep them clear from Weeds, which are apt to draw the Plants up tall (if suffer'd to grow amongst them) and often spoil them.

These Cabbages will some of them be fit for Use soon after *Michaelmas*, and will continue until *February*, if they are not destroyed by bad Weather : To prevent which, the Gardeners near *London*, pull up their Cabbages in *November*, and trench their Ground up in Ridges, laying their Cabbages against their Ridges as close as possible on one Side, burying their Stems in the Ground: In this manner they let them remain till after *Christmas*, when they cut them for the Market ; and altho' the outer Part of the Cabbage be decay'd, (as is often the Case in very wet or hard Winters) yet, if the Cabbages were large and hard when laid, the Inside will remain sound.

The Russian Cabbage was formerly in much greater Esteem than at present, it being now only to be found in particular Gentlemens Gardens, who cultivate it for their own Use, and is rarely ever brought to the Market. This must be sown in the Spring of the Year, and managed as those before directed, with this Difference only, that these must be sooner planted out for good, and must have an open clear Spot of Ground, and require much less Distance every Way, for it is but a very small hard Cabbage. These will be fit for Use in *July* or *August*, but will not continue long before they will break and run up to Seed. The best Method to have these Cabbages good, is to procure fresh Seeds from abroad every Year ; for 'tis apt to degenerate in *England* in a few Years.

The early Battersea and Sugar-loaf Cabbages are commonly sown for Summer Use, and are what the Gardeners about *London* commonly call *Michaelmas Cabbages*. The Season for sowing of these is about the End of *July*, in an open Spot of Ground ; and when the Plants have got eight Leaves, you must prick them out into Beds at about three Inches Distance every Way, that the Plants may grow strong and short-shank'd ; and in the Beginning of *October* you should plant them out for good : The Distance that these require is, three Feet Row from Row, and two Feet asunder in the Rows. The Gardeners near *London* commonly plant these Cabbages upon the same Spot of Ground where their Winter *Spinage* is sown ; so that when the *Spinage* is clear'd off in the Spring, the Ground will have a Crop of Cabbages upon it ; you must therefore clear off the *Spinage* just round each Plant early in the Spring, that with a Hoe you may draw the Earth

Earth up to the Stem; and when all your *Spinage* is clear'd off, which is commonly in *April*, you must hoe down all the Weeds, and draw up the Earth again about your *Cabbage*-Plants.

In *May*, if your Plants were of the early Kind, they will turn in their Leaves for Cabbaging; at which time, the Gardeners near *London*, in order to obtain them a little sooner, tie in their Leaves close with a slender Osier Twig to blanch their Middle; by which means they have them, at least, a Fortnight sooner than they could have in the common Way.

The early *Battersea-Cabbage* being the first we should chuse, (if for a Gentleman's Use) to plant the fewer of them, and a greater Quantity of the *Sugar-Loaf* Kind, which comes after them; for the *Battersea* Kind will not supply you long, they generally cabbaging apace when they begin, and as soon grow hard and burst open: But the *Sugar-loaf* Kind is longer before it comes, and is as slow in its cabbaging, and, being of a hollow Kind, will continue good for a long time: I have known a large Quarter of Ground which was planted with this sort of *Cabbage* for Market Use, which hath afforded a Supply for near three Months together. This, tho' of singular Service to a Gentleman's Garden, is not so much for the Advantage of the Market Gardener, who loves to have his Ground clear'd sooner, that he may have another Crop upon it, of *Celery*, *Endive*, &c. which is more to his Purpose; for they paying large Rents for their Land, are oblig'd to have as many Crops in a Year from it as possible.

Altho' I before have advis'd the planting out of your *Cabbages* for good in *October*; yet the *Sugar-loaf* Kind may be planted out in *February*, and will succeed as well as if planted earlier, with this Difference only, that they will be later before they cabbage. You should also reserve some Plants of the *Battersea* Kind in some well-shelter'd Spot of Ground, to supply your Plantation, in case of a Defect.

The *Savoy Cabbages* are propagated for Winter Use, as being generally esteem'd the better when pinch'd by the Frost; these must be sown about the Beginning of *April*, and treated after the manner as was directed for the common *white Cabbage*, with this Difference, that these may be planted at a closer Distance than those; two Feet square will be sufficient, these are always much the better when planted in an open Situation, which is clear from Trees and Hedges; for in close Places they are very subject to be eaten almost up by Caterpillars and other Vermin, especially if the Autumn prove dry.

The *Boor-Cole* may be also treated in the same manner, but need not be planted above one Foot square: These are never eaten 'till the Frost hath render'd them tender; for otherwise they are tough and bitter.

The Seeds of the *Broccoli* (of which there are several Kinds, viz. the *Roman*, *Neapolitan*, and *black Broccoli*, with some others, but the *Roman* is chiefly preferr'd to them all,)

should be sown about the Middle or Latter end of *May*, in a moist Soil; and when the Plants are grown to have eight Leaves, transplant them into Beds, (as was directed for the common *Cabbage*) and toward the Middle or Latter-end of *July* they will be fit to plant out for good, which should be into some well-shelter'd Spot of Ground, but not under the Drip of Trees: The Distance these require is about a Foot every way. The Soil in which they should be planted ought to be rather light than heavy, such as are the Kitchen-Gardens near *London*: If your Plants succeed well (as there will be little Reason to doubt, unless the Winter prove extreme hard) they will begin to shew their small Heads, which are somewhat like a *Colliflower*, about the beginning of *December*, and will continue eatable 'till the Beginning of *March*.

The Manner of preparing them for the Table, is this; When your Heads are grown to their full Bigness, (as may be easily known by their dividing, and beginning to run up) then you should cut them off, with about four Inches of the tender Stem to them; then strip off the outer Skin of the Stem, and after having wash'd them, boil them in a clean Linen-cloth, (as is practis'd for *Colliflowers*) and serve them up with Butter, &c. and if they are of a right Kind, they will be tenderer than any *Colliflowers*, tho' very like unto them in taste. When your first Heads are cut off, in about a Month's time after they will produce a number of Side-shoots, which being cut and stripp'd of their outer Skin, are very tender and good, almost equalling *Asparagus*. The surest way to have these good, is to be furnish'd with fresh Seeds from *Italy* every Year; for they are very apt to degenerate in a Year or two, if the Seeds are sowed in *England*.

The Manner of saving the Seeds of all these Sorts of *Cabbages*, is, about the Middle of *October*, you should make choice of some of your best *Cabbages*, which you should pull up, and carry to some Shed or other cover'd Place, where you should hang them up for three or four Days by their Stalks, that the Water may drain from between their Leaves; then plant them in some Border under a Hedge or Pale, quite down to the Middle of the *Cabbage*, leaving only the upper-part of the *Cabbage* above-ground, observing to raise the Earth up about it, so that it may stand a little above the Level of the Ground; especially if the Ground is wet, they will require to be rais'd pretty much.

If the Winter should prove very hard, you must lay a little Straw or Pease Haulm lightly upon them; taking it off as often as the Weather proves mild, lest by keeping them too close they should rot. In the Spring of the Year these *Cabbages* will shoot out strongly, and divide into a great number of small Branches; you must therefore support their Stems, to prevent their being broke off by the Wind; and if the Weather should be very hot and dry, you should refresh them with

Water

Water once a Week, which will greatly promote their Seeding, especially at the time when they are in Flower.

When the Pods begin to change brown, you will do well to cut off the extreme part of every Shoot; which will strengthen your Seeds: And it is generally observ'd, that those Seeds which grow near the top of the Shoots, are very subject to run to Seed before they cabbage; so that by this there will be no Loss, but a great Advantage, especially if you have more regard to the Quality than to the Quantity of the Seeds; which indeed is not always the Case, when it is intended for Sale: but those who save it for their own Use, should be very careful to have it good.

When your Seeds begin to ripen, you must be particularly careful that the Birds do not destroy it; for they are very fond of these Seeds. In order to prevent their Mischief, some use old Nets, which they throw over their Seeds, to prevent their getting to it: But this will not always do; for unless the Nets are very strong, they will force their way through them, as I have often seen: but the best Method I know, is to get a Quantity of Birdlime, and dawb over a parcel of slender Twigs, which should be fasten'd at each end to stronger Sticks, and placed near the upper part of the Seed, in different Places, so that the Birds may alight upon them, by which means they will be fastned thereto; where you must let them remain for a considerable Time, if they cannot get off themselves: And altho' there should not above two or three Birds be caught, yet it will sufficiently terrify the rest, that they will not come to that Place again for a considerable Time, (as I have experienc'd.)

When your Seeds are fully ripe, you must cut it off; and after drying it, thresh it out and preserve it in Bags for Use.

But in planting of *Cabbages* for Seed, I would advise never to plant more than one Sort in a Place, or near one another. As for Example: Never plant *red* and *white Cabbages* near each other, nor *Savoy* with either *white* or *red Cabbages*: For I am very certain they will, by the Commixture of their *Effluvia*, produce a Mixture of Kinds: And it is wholly owing to this Neglect, that the Gardeners rarely save any good *red Cabbage-seed* in *England*, but are obliged to procure fresh Seeds from abroad, as supposing the Soil or Climate of *England* alters them from *Red* to *White*, and of a mix'd Kind between both; whereas if they would plant *red Cabbages* by themselves for Seed, and not suffer any other to be near them, they might continue the Kind as good in *England*, as in any other Part of the World.

Colliflowers have of late Years been so far improv'd in *England*, as to exceed in Goodness and Magnitude what are produced in most Parts of *Europe*, and by the Skill of the Gardener are continued for several Months together; but the most common Season for them is in *May*, *June*, and *July*. I shall therefore begin with Directions for obtaining them in this Season.

Having procured a parcel of good Seed, of an early Kind, you must sow it on the Tenth of *August*, upon an old *Cucumber-bed* or *Melon-bed*, sifting a little Earth over the Seeds about a quarter of an Inch thick; and if the Weather should prove extreme hot and dry, you should shade the Beds with Mats, to prevent the Earth from drying too fast, which would endanger the spoiling of your Seed; and give it gentle Waterings, as you may see occasion; in about a Week's time your Seed will appear above-ground, when you must take off your Coverings by degrees. But do not expose your Plants too much to the open Sun at first: In about a Month's time after sowing, your Plants will be fit to prick out; you should therefore put some fresh Earth upon your old *Cucumber* or *Melon-beds*, into which you should prick your young Plants, at about two Inches square, observing to shade and water them at first planting; but do not water them too much after they are growing, nor suffer them to receive too much Rain, if the Season should prove wet, which would be apt to make them black-shank'd (as the Gardeners term it, which is no less than a Rottenness in their Stems) and is the Destruction of the Plants so affected.

In this Place they should continue 'till about the Sixteenth Day of *October*, when they must be removed into the Place where they are to remain during the Winter-season, which, for this first sowing, is commonly under Bell or Hand-glasses, to have early *Colliflowers*; and these should be of an early Kind: But in order to have a Succession during the Season, we should be provided with another more late Kind, which should be sown four or five Days after the other, and manag'd as was directed for them.

In order to have very early *Colliflowers*, we should make choice of a good rich Spot of Ground, that is well defended from the *North*, *East*, and *West* Winds with Hedges, Pales, or Walls: This Ground should be well trench'd, burying therein a good Quantity of rotten Dung; then level your Ground: And if it be naturally a wet Soil, you should raise it up in Beds about two Feet and a half broad, and four Inches above the Level of the Ground. But if your Ground is moderately dry, you need not raise it at all: Then plant your Plants about two Feet four Inches Distance from Glass to Glass in the Rows, always putting two good Plants under each Glass, which may be at about four Inches from each other; and if you design 'em for a full Crop, they may be three Feet Row from Row: But if you intend to make Ridges for Cucumbers or Melons between the Rows of *Colliflower-Plants*, (as is generally practis'd by the Gardeners near *London*) you must then make your Rows eight Feet asunder.

When you have planted your Plants if the Ground is very dry, you should give them a little Water, and then set your Glasses over them, which may remain close down upon them, until they have taken Root, which will be in about a Week or ten Days time; unless

unless there should be a kindly Shower of Rain, in which case you may set off the Glasses, that the Plants may receive the Benefit of it; and in about ten Days after planting, you should be provided with a parcel of forked Sticks, or Bricks, with which you should raise your Glasses about three or four Inches to the Southward, that your Plants may have free Air: In this manner your Glasses should remain over the Plants, Night and Day, unless in frosty Weather, when you should set them down as close as possible; or if the Weather should prove very warm, which many times happens in *November* and sometimes in *December*; in this Case, you should keep your Glasses off in the Day-time, and put them on only in the Night, lest by keeping the Glasses over them too much, you should draw them into Flower at that Season; which is many times the Case in mild Winters, especially if unskilfully manag'd.

Towards the latter-end of *February*, if the Weather be mild, you should prepare another good Spot of Ground, to remove some of the Plants into, from under the Glasses, which should be well dung'd and trench'd (as before;) then set off your Glasses; and after making choice of one of the most promising Plants under each Glass which should remain for good, take away the other Plant, by raising it up with a Trowel, &c. so as to preserve as much Earth to the Roots as possible; but have a great Regard to the Plant that is to remain, not to disturb or prejudice its Roots: Then plant out your Plants which you have taken out, at the Distance before directed, viz. if for a full Crop, three Feet, Row from Row; but if for Ridges of Cucumbers between them, eight Feet, and two Feet four Inches Distance in the Rows. Then with a small Hoe draw the Earth up to the Stems of the Plants which were left under the Glasses, taking great Care not to let the Earth fall into their Hearts: Then set your Glasses over them again, raising your Props an Inch or two higher, to give them more Air, observing to take them off whenever there may be some gentle Showers, which will greatly refresh the Plants.

And in a little time after, if you find your Plants grow so fast as to fill the Glasses, you should then slightly dig about the Plants, and raise the Ground about them in a Bed broad enough for the Glasses to stand, and about four Inches high, which will give your Plants a great deal of Room, when the Glasses are set over them; and by this Means they may be kept cover'd until *April*, which otherwise they could not, without Prejudice to the Leaves of the Plants: And this is a great Advantage to them; for many times we have Returns of severe Frosts at the Latter-end of *March*, which prove very hurtful to these Plants, if expos'd thereto, especially after having been nurs'd up under Glasses.

After you have finish'd your Beds, you may set your Glasses over your Plants again, observing to raise your Props pretty high, especially if the Weather be mild, that they

may have free Air to strengthen them; and in mild soft Weather set off your Glasses, as also in gentle Showers of Rain: And now you must begin to harden them by degrees to endure the open Air; however, it is advisable to let your Glasses remain over them as long as possible, if the Nights should be frosty, which will greatly forward your Plants: but be sure do not let your Glasses remain upon them in very hot Sun-shine, especially if their Leaves press against the Sides of the Glasses: For I have often observ'd, in such Cases, that the Moisture which hath risen from the Ground, together with the Perspiration of the Plants, which, by the Glasses remaining over them, hath been detain'd upon the Leaves of the Plant, and when the Sun hath shone hot upon the Sides of the Glasses, hath acquir'd such a powerful Heat from the Beams thereof, as to scald all their larger Leaves, to the no small Prejudice of the Plants: Nay, sometimes I have seen large Quantities of Plants so affected herewith, as never to be worth any thing after.

If your Plants have succeeded well, towards the End of *April* some of them will begin to Fruit; you must therefore look over them carefully every other Day, and when you see the Flower plainly appear, you must break down some of the inner Leaves over it to guard it from the Sun, which would make the Flower yellow and unsightly; and when you find your Flower at its full Bigness, (which you may know by its Outside, parting, as if it would run, you must then draw it out of the Ground, and not cut them off, leaving the Stalk in the Ground; as is by some practis'd: And if they are design'd for present Use, you may cut them out of their Leaves; but if design'd to keep, you should preserve their Leaves about them, and put them into a cool Place. The best Time for pulling of them, is in a Morning, before the Sun hath exhal'd the Moisture; for *Colliflowers* pull'd in the Heat of the Day, lose that Firmness which they naturally have, and become tough.

But to return to our *Second Crop* (the Plants being rais'd and manag'd as was directed for the *Early Crop*, until the Middle or Latter-end of *October*) you must then prepare some Beds, either to be cover'd with Glass-Frames, or arch'd over with Hoops, to be cover'd with Mats, &c. these Beds should have some Dung laid in the Bottom, about six Inches or a Foot thick, according to the Size of your Plants; for if they are small, the Bed should be thicker of Dung, to bring them forward, and so *vice versa*; this Dung should be beat down close with a Fork, in order to prevent the Worms from finding their Way through it: Then lay some good fresh Earth about four or five Inches thick thereon, in which you should plant your Plants about two Inches and a half square, observing to shade and water them until they have taken fresh Root: But be sure do not keep your Coverings close; for the Warmth of the Dung will occasion a large Damp in
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the Bed, which, if pent in, will greatly injure the Plants.

When your Plants have taken Root, you must give them as much free open Air as possible, by keeping the Glasses off in the Day-time as much as the Weather will permit; and in the Night, or at such Times as the Glasses require to be kept on, raise them up with Bricks to let in fresh Air, unless in frosty Weather; at which time the Glasses should be cover'd with Mats, Straw, or Pease-haulm, &c. but this is not to be done but in very hard Frosts: You must also observe to guard them against great Rains, which in Winter-time are very hurtful to them; and if the under Leaves grow yellow and decay, be sure to pick them off, for if the Weather should prove very bad in Winter, so that you should be oblig'd to keep them close cover'd for two or three Days together, as it sometimes happens, these decay'd Leaves will render the inclos'd Air very noxious, and the Plants inspiring pretty much at that time, are often destroy'd in vast Quantities.

In the Beginning of *February*, if the Weather be mild, you must begin to harden your Plants by degrees, that they may be prepar'd for Transplantation; and the Ground where you intend to plant your *Colliflowers* out for good, (which should be quite open from Trees, &c. and rather moist than dry) having been well dung'd and dug, should be sown with *Radishes* a Week or Fortnight before you intend to plant out your *Colliflowers*: The Reason why I mention the sowing of *Radishes* particularly, is this, (*viz.*) that if there is not some *Radishes* amongst them, and *May* should prove hot and dry, as it sometimes happens, the Fly will seize your *Colliflowers*, and eat them full of Holes, to their Prejudice, and sometimes their Destruction; whereas, if there are *Radishes* upon the Spot, the Flies will take to them, and never meddle with the *Colliflowers* so long as they last: Indeed the Gardeners near *London* mix *Spinage* with their *Radish*-Seed, and so have a double Crop; which is an Advantage where Ground is dear, or that Persons are streighten'd for Room, otherwise it is very well to have only one Crop amongst the *Colliflowers*, that the Ground may be cleared in time.

Your Ground being ready, and the Season good, about the Middle of *February*, you may begin to plant out your *Colliflowers*: The Distance which is generally allow'd by the Gardeners near *London* (who plant other Crops between their *Colliflowers* to succeed them, as *Cucumbers* for pickling, and *Winter Cabbages*) is every other Row four Feet and a half apart and the intermediate Rows two Feet and a half, and two Feet two Inches Distance in the Rows; so that in the Middle, or towards the latter End of *May*, (when the *Radishes* and *Spinage* are cleared off) they put in Seeds of *Cucumbers* for Pickling, in the Middle of the wide Rows, at three Feet and a half apart; and in the narrow Rows, plant *Cabbages* for Winter Use, at two Feet two Inches Distance so that these stand each of them exactly in the Middle of the Square between four *Colliflower*-

Plants; and these, after the *Colliflowers* are gone off, will have full Room to grow, and the Crops be hereby continu'd in a Succession through the whole Season.

About three Weeks or a Month after your *Colliflowers* are planted out, the *Radishes* between them will be fit to hoe; at which time, when you are hoeing out the *Radishes*, where they are too thick, you should cut off all such as grow immediately about the *Colliflowers*, and would prove hurtful to them, by drawing them up tall and weak, and also at that time draw the Earth up to the Stems of the Plants, being careful not to let any get into their Hearts, (as was before directed); and when your *Radishes* are fit to pull, be sure to clear round the *Colliflowers* first, and keep drawing the Earth up to their Stems as they advance in Height, which will keep their Stems from being harden'd by the Weather, and be of singular Service to your Plants.

There are many People, who are very fond of watering *Colliflower*-Plants in Summer, but the Gardeners near *London* have almost wholly laid aside this Practice, as finding a deal of Trouble and Charge to little Purpose, for if the Ground be so very dry as not to produce tolerable good *Colliflowers* without Water, it seldom happens, that watering of them renders them much better; and when once they have been water'd, if it is not constantly continu'd, it had been much better for them if they never had had any; as also, if it be given them in the Middle of the Day, it rather helps to scald them: So that upon the Whole, if Care be taken to keep the Earth drawn up to their Stems, and clear them from every Thing that grows near them, that they may have free open Air, we shall find that they will succeed better without than with Water, where any of these Cautions are not strictly follow'd.

When your *Colliflowers* begin to Fruit, you must often look over them, to turn down their Leaves, as was before directed, to preserve their Whiteness; and when they are full grown, observe the former Directions in pulling them, &c. But where-ever you meet with an extraordinary good *Colliflower*, whose Curd is hard and white, and perfectly free from any Frothiness about the Edges, you should suffer it to remain for Seed, keeping the Leaves close down upon it until the Flower hath shot out Stems, and then remove the Leaves from them by degrees, but do not expose them too much to the open Air at first: As the Stems advance, you must take the Leaves quite away; and when they begin to branch out, you should fix three pretty strong Stakes, at equal Angles, about it, surrounding them with Packthread, &c. to support their Branches, which would be otherwise liable to break with the Wind.

When your Pods begin first to be form'd, if the Weather be dry, you should give them a little Water all over, (with a Watering-pot that hath a Rose to it) which will promote the Progress of the Seeds, and preserve 'em from the Mildew, which is often hurtful to these

Seeds;

Seeds; and when your Seeds are ripe, you must cut it off, and hang it up to dry, and rub it out, as was directed for *Cabbage-Seed*: And although your Flowers do not produce so much Seed as those which were of a softer or frothy Nature, yet the Goodness of such Seeds will sufficiently recompense for the Quantity; and any Person who was to purchase his Seeds, had better give ten Shillings an Ounce for such Seeds than two for the Seeds commonly fav'd for Sale; as the Gardeners about London have experienc'd, who will never buy any Seeds of this Kind, that they do not know how they were fav'd.

But in order to have a third Crop of *Colliflowers*, you should make a slender Hot-bed in February, in which you should sow the Seeds, covering them a quarter of an Inch thick with light Mould, and covering the Bed with Glass Frames; you should now and then gently refresh the Bed with Water, observing to raise the Glasses with Bricks in the Day-time to let in fresh Air; and when the Plants are come up, and have gotten four or five Leaves, you should prepare another Hot-bed to prick them into, which may be about two Inches square; and in April harden them by degrees, to fit them for transplanting, which should be done about the latter End of that Month at the Distances directed for the second Crop, and must be manag'd accordingly: These (if the Soil is moist where they are planted or the Season cool and moist) will produce good *Colliflowers* about a Month after the second Crop is gone, whereby their Season will be greatly prolong'd.

There is also a fourth Crop of *Colliflowers*, which is rais'd by sowing the Seed about the twelfth of May; and being transplanted, as hath been before directed, will produce good *Colliflowers* in a kindly Season, and good Soil after *Michaelmas*, and continue thro' *October* and *November*, and if the Season permit, often a great part of *December*.

The Reason why I fix particular Days for the sowing of this Seed, is, because two or three Days often make a great Difference in their Plants; and because these are the Days usually fix'd by the Gardeners near London, who have found their Crops to succeed best when sown at those Times, although one Day sooner or later will make no great Odds.

BROOM, the Common; *vide* *Cytiso-Genista Scoparia*.

BROOM, the Spanish; *vide* *Spartium*, & *Genista*.

BRUNELLA, Self-heal.

The Characters are;

The Flowers grow in short compact Spikes, which consist of one Leaf, and are labiated (or lip'd); the Crest (or upper Lip) is intire and hollow'd; the Beard (or lower Lip) is divided into three Segments; the middle Segment is broad, and hollow, like a Spoon, and is farther produc'd than the two other Segments which are narrow; the Cup of the Flower hath two Lips; the upper being erect and trifid, and the lower is arm'd with two small Spines.

There are several Species of this Plant preserv'd in the curious *Botanick Gardens*: I shall mention the Varieties to be found in the *English Gardens*, and then give a short Account of their Culture.

1. **BRUNELLA**; *major*, *folio non dissecto*, C. B. Common Self-heal, with whole Leaves.

2. **BRUNELLA**; *major*, *folio non dissecto flore Alba*. C. B. Common Self-heal, with white Flowers.

3. **BRUNELLA**; *folio laciniato*. C. B. Cut-leav'd Self-heal.

4. **BRUNELLA**; *folio laciniato*; *flore albo*. H. R. P. Cut-leav'd Self-heal, with white Flowers.

5. **BRUNELLA**; *Cerulea*, *magno flore* C. B. Large blue-flower'd Self-heal.

6. **BRUNELLA**; *Hyssopifolia*. C. B. Narrow leav'd Self-heal.

7. **BRUNELLA**; *Alpina*; *laciniata*; *flore magno*. Boerb. Ind. Large-flower'd cut-leav'd Self-heal from the Alps.

8. **BRUNELLA**; *folio verbenæ tenuifoliæ*. Boerb. Ind. Self-heal, with Leaves like the narrow cut-leav'd *Vervain*.

9. **BRUNELLA**; *laciniata*; *flore elegantissimè sulphureo*. Boerb. Ind. Cut-leav'd Self-heal, with fine Sulphur-colour'd Flowers.

10. **BRUNELLA**; *latifolia*; *Italica*; *flore carneo*. Barret. Broad-leav'd Italian Self-heal, with Flesh-colour'd Flowers.

11. **BRUNELLA**; *Novæ Angliæ*; *major*; *foliis longius mucronatis*. Rand. New-England Self-heal, with long-pointed Leaves.

12. **BRUNELLA**; *Caroliniana magno flore dilutè caruleo internodiis longissimis*. Rand. Carolina Self-heal, with large pale blue Flowers, and long Spaces between the Joints of the Stalks.

These Plants may be any of them propagated by sowing their Seeds in the Spring of the Year, on a Bed of common Earth, and when they are come up, may be planted out in Borders in any shady part of the Garden, where they will thrive, and many of them flower the same Year, but all of them the second, after which they seldom continue, therefore the Seeds of them must be sown yearly for a fresh Supply.

The first Sort is used in Medicine, and is very common in divers Parts of England: The others are of foreign Growth; and although there is not a great deal of Beauty in them, yet some of the Varieties are worth cultivating to add to the Diversity, especially since they require very little Culture.

BRUSCUS; *vide* *Ruscus*.

BRYONIA; [This Plant is so call'd of *ῥυον*, signifying to shoot or spring, because it is a Plant of luxuriant Growth] Bryony.

The Characters are;

It hath a climbing Stalk with Spines; the Leaves are like those of the Vine; the Flowers consist of one Leaf, which is expanded at the Top, and divided into five Parts; and in the Female Plants are succeeded by round Berries growing

growing on Footstalks; the Flowers of the Male Plants have five Apices in each, but are barren.

There are several Species of this Plant, which are cultivated in the Botanick Gardens; but since there is no great Beauty in them, I shall pass them over, and only mention the common Sort which is used in Medicine, and is,

BRYONIA; *aspera*; five *alba*; *baccis rubris*. C. B. The common White Bryony.

This Plant grows upon dry Banks under Hedges in many Parts of England, but may be cultivated in a Garden for Use, by sowing the Berries in the Spring of the Year in a dry poor Soil, where they will in two Years time grow to be large Roots, provided they are not too thick. The Roots of this Plant have been formerly cut into a human Shape, and carry'd about the Country, and shewn for *Mandrakes* by a Parcel of idle People, who very easily impos'd on the Credulity of the common People, and got good Livings thereby. The Leaves of this Plant are also often impos'd on the People in the Market for *Mandrake-leaves*, altho' there is no Resemblance between them, nor any Agreement in Quality.

BRYONIA NIGRA; *vide* Tamnus.

BUCKSHORN, or **HARTSHORN**; *vide* Coronopus.

BUGLOSSUM, *βυλωσ*, of *βί* an Ox, and *λωσ* a Tongue, q. d. Ox-Tongue, because the Leaves of this Plant imitate the Tongue of an Ox in their Shape and Roughness.] Bugloss.

The Characters are;

The Flowers are small and tubulous, divided at the Top into five obtuse Segments, and are expanded in a round Form; the Seeds are like the Head of a Viper.

The Species are;

1. **BUGLOSSUM**; *pereune*; *majus*; *sativum*. M. H. The Garden Bugloss.
2. **BUGLOSSUM**; *sylvestre*; *minus*. C. B. The lesser Wild Bugloss.
3. **BUGLOSSUM**; *latifolium*; *semper-virens*. C. B. The Broad-leav'd Ever-Green Bugloss.
4. **BUGLOSSUM** *Oriente*; *flore luteo*. T. Cor. The Eastern Bugloss, with yellow Flowers.
5. **BUGLOSSUM**; *Creticum*; *verrucosum*; *perlatum quibusdam*. H. R. Par. Warted Bugloss from Crete.

There are several other Varieties of this Plant, which are cultivated in Botanick Gardens; but these mention'd, are the chief Sorts which are to be found in the English Gardens. They may be cultivated, by sowing their Seeds in the Spring, in Beds of common undung'd Earth, and may be afterwards transplanted, where they are to remain: They all delight in a dry poor Soil.

The first Sort is cultivated for its Flowers, which are used in Medicinal Cordials. The second Sort grows wild upon dry Banks, in most Parts of England, and is sometimes used in Medicine. The third Sort is always green, and may have a Place in shady Wildernesses, but is not fit for a fine Garden. The fourth Sort is an abiding Plant, and may deserve a

Place in a good Garden, for its long Continuance to flower. The fifth Sort is an Annual, and if suffer'd to sow it-self, will come up and abide the Winter very well, and produce its small blue Flowers in the Spring. These two last, for their Variety, may have a Place in the Flower-Garden, and the first Sort in the Physick-Garden, for its Use.

BUGLIA; Bugle.

There are several Varieties of this Plant, some of which are cultivated in Botanick-Gardens: But as they are Plants of no great Beauty or Use, so I shall pass them over here, and only observe, that two Varieties of this Plant are very common in moist Meadows in England; these two are indifferently used in Medicine, and call'd in the Shops *Consolida Media*, or the Middle Consound.

BULB, [*Bulbus*, Lat. of *βύλος*, Gr.] A Bulbous Root consists of many Coats inclos'd one within another, or join'd together by many Scales dispos'd in an imbricated manner, and is of an orbicular Form, sending forth many Fibres from its Base. Of this Class are *Onions*, *Tulips*, &c.

BULBOCASTANUM, [of *Bulbus* a Bulb, and *Castanea*, Lat. a Chestnut,] Earth-Nuts.

This is an Umbelliferous Plant, which is found wild in many Parts of England, and may be propagated by sowing the Seeds, as soon as they are ripe, in a moist Soil.

BULBOCODIUM, [of *Bulbus* a Bulb, and *Codium*.]

The Characters are,

The Flowers consist of one Leaf, and are divided into six Segments, being in Shape like the Crocus Flower; the Leaves are very long and narrow; the Root consists of solid Bulbs, one over the other, which are closely join'd.

We have but one Species of this Plant in the English Gardens, which is;

BULBOCODIUM; *Crocifolium*; *flore parvo violaceo*. T. Cor. *Bulbocodium*, with Leaves like the Saffron and small Violet-colour'd Flowers.

This Plant is cultivated after the manner of the Spring Crocus's, viz. by parting its Bulbs, or sowing the Seeds: It is commonly three or four Years before it comes to flower from Seed; but as it increases but slowly by the Root, so we must sow the Seeds, if we intend to have a Stock of this Plant: It flowers in April, and the Seeds are ripe in June, and should be sown soon after in Pots of common Earth, where they should remain two Years undisturb'd, and then may be planted out into a Border at about three Inches square, where they may stand to flower: It is also very probable that some other Colours may be obtain'd by sowing the Seeds, as we find is often the Case with most other Bulbs when rais'd from Seeds.

BUPHTHALMUM; [*βυφθαλμ*, of *βί* an Ox or Bull; and *οφθαλμ* an Eye, q. d. an Ox Eye, because the Flower resembles an Eye] Ox-Eye.

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The Characters are;

The whole Face of the Plant is like Tansy: The Flowers, which are radiated, are for the most part produced singly: The Florets of the Disk are separated with an imbricated little Leaf.

The Species are;

1. BUPHTHALMUM; *tanacetii minoris folio*. C. B. The common Ox-eye, with Leaves like Tansy.

2. BUPHTHALMUM; *Orientalis; tanacetii minoris folio; flore luteo amplissimo*. T. Cor. The Eastern Ox-eye, with large yellow Flowers.

3. BUPHTHALMUM; *Orientalis; tanacetii minoris folio; flore luteo amplissimo*. T. Cor. The Eastern Ox-eye, with large white Flowers.

The first of these Plants is mention'd by Mr. Ray as a Native of England; but is rarely found wild with us. The other two were found by Monsieur Tournefort, in the Levant. These are propagated, by sowing their Seeds in March, in a Bed of light Earth; and when they are come up, may be transplanted into Borders of the Flower-Garden, or in little Wilderness Knots. These Plants do continue flowering almost all the Summer long; for which they deserve a Place in every good Garden. The Flowers are very proper to gather for Flower-pots, to adorn Rooms and Chimnies in the Summer-season.

They delight in a dry Soil, and such as is not much dung'd; and may also be increas'd by parting their Roots at Michaelmas, or early in the Spring. The first Sort is sometimes used in Medicine.

BUPLEURIODES, [of *βύς* *πλευρῖς* and *ἄστρον*, Form or Shape.] See *Bupleurum*.

The Characters are;

The Leaves grow together by two's and three's in the same Place: The End of the Foot-stalk bears an oblong Ovary, the Apex of which is crown'd with a naked, herbaceous, pentapetalous Flower, the Petals being rolled up, inclosing five Stamina. The Ovary has a Tube cleft in two, the Apices of which are backwards, and rough: When ripe, it passes into two longish Seeds; the Flowers are dispos'd in the Form of an Umbel or Umbrella.

BUPLEUROIDES; *quæ simpla nobis Canariensium*. Pluk. Alm.

There is at present but this one Species of this Plant known; it was formerly growing in many English Gardens, but was intirely lost in the Gardens near London; till in 1727 I brought it over from Holland again. It is a Plant of no great Beauty; but as it is an Ever-Green, may be kept, to add to the Variety in the Green-house. It is pretty hardy, and will endure our Winters with very little Shelter; and is propagated by sowing of the Seeds in March in a Bed of common Earth, where they will easily come up, and may be afterwards transplanted into Pots, in order to remove them in Winter into Shelter. They require to be often water'd, and love open Air.

BUPLEURUM, [*βύς* *πλευρῖς*, of *βύς* an Ox, and *πλευρῖς* a Side, because it is said to cause a

Crepitation of the Side of an Ox, but more probably, because it affords the Ox a Bed: Or it may be suppos'd to be so call'd, because the Leaves bear some Resemblance to the Rib of an Ox; or of *βύς* great, and *πλευρῖς* Side, as tho' Large Rib.] Hare's-Ear.

The Characters are;

The Leaves grow alternately upon the Branches, and, for the most part, surround the Stalk, having no Foot-stalk: The Seeds are oblong, smooth, and furrow'd.

There are two or three Varieties of this Plant, which are Annuals: But as they have no great Beauty in them, I shall pass them over, and only mention one Sort, which is commonly preserv'd in Gardens; as,

BUPLEURUM; *arborescens; folio salicis*. Tourn. *Seseli Æthiopium, frutex*. Dod. The Shrubby Hartworth of Æthiopia.

This is a shrubby Plant, commonly growing to the Height of six or seven Feet, and divides into many Branches; the Leaves, which are ever-green, are somewhat like those of the broad-leav'd Willow, but much thicker. This Shrub is hardy, and will endure our severest Winters in the open Air, provided it is planted in a dry Soil. This may be increas'd by sowing the Seeds in Autumn, so soon as they are ripe, in a Pot of common Earth, which should be put under Shelter in very cold Weather, but not kept too dry: In the Spring following the Seeds will come, and when the young Plants have acquir'd a little Strength, may be planted in a Border a little defended from cold Winds, where they may continue for a Year or two, and then be remov'd where they are design'd to remain. The Cuttings of this Tree will also take Root; but this being a less certain Method than the other, and as the Plant produces large Quantities of Seeds, it is hardly worth the Trial.

BURNET; vide *Pimpinella*.

BURSA PASTORIS; Shepherd's-Pouch. This is a common Weed in most Parts of England.

BUTOMUS; [*βύττον* of *βύς* an Ox, and *τίμα* to cut, so call'd, because the Leaves of it are so acute, that the Tongue and Lips of Oxen, who are great Lovers of this Plant, are wounded by it, so that the Blood issues forth: It is also call'd *Juncus florida*, because it has the Leaves of a *Butrush*.] The Flowering Rush or Water Gladiole.

The Characters are;

The Leaves are triangular and grassy: The Stalks are naked: The Flowers are dispos'd in an Umbel upon the Top of the Stalk, and each consists of six Leaves; three of them are large, and three small, which are expanded in Form of a Rose.

The Species are;

1. BUTOMUS; *flore roseo*. Tourn. The Rose-colour'd Flowering Rush.

2. BUTOMUS; *flore albo*. Tourn. The White Flowering Rush.

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3. *BUTOMUS*; *flore saturate purpureo*. Boerh. Ind. The deep Purple-colour'd Flowering Rush.

The first of these Varieties is pretty common in standing Waters in many Parts of England; the other two are Varieties of this, tho' less common with us. These Plants may be propagated in boggy Places, or by planting them in Cisterns, which should be kept fill'd with Water, that should have about a Foot Thickness of Earth in the Bottom: These, though common Plants, yet produce very pretty Flowers, and are worth propagating for Variety sake, especially if in any Part of the Garden there should be Conveniency for an artificial Bog, as is many times the Case, and Persons are at a Loss what to plant in such Places, that may appear beautiful, whereas if these and a few more wild Plants, which naturally grow in such Places, were taken into the Garden, they would have a very good Effect in diversifying the several Parts thereof.

BUXUS; The Box-Tree.

The Characters are;

The Leaves are pennated, and ever-green; it hath Male Flowers, which are produc'd at remote Distances from the Fruit on the same Tree: The Fruit is shap'd like a Porridge-pot inverted, and is divided into three Cells, containing two Seeds in each; which, when ripe, are cast forth by the Elasticity of the Vessel.

The Species are;

1. *Buxus*; *arborescens*. C. B. The Box-Tree.
2. *Buxus*; *arborescens*; *angustifolia*. The narrow-leav'd Box-Tree.
3. *Buxus*; *foliis ex luteo variegatis*. H. R. Par. Strip'd Box.
4. *Buxus*; *major*; *foliis per limbum aureis*. H. R. Par. The Gold-edg'd Box-Tree.
5. *Buxus*; *humilis*. Dod. The Dwarf-Box.
6. *Buxus*; *humilis*; *foliis variegatis*. The Dwarf-strip'd Box.
7. *Buxus*; *major*; *foliis per limbum argenteis*. The Silver-edg'd Box.

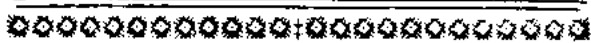
The first and second Sorts grow in great Plenty upon Box-hill near Dorking in Surrey, where were formerly large Trees of these Kinds, but of late they have been pretty much destroy'd, yet there are great Numbers of the Trees remaining which are of a considerable Bigness. The Wood of this Tree is very useful for Turners, Ingravers, and Mathematical Instrument-makers, the Wood being so hard, close and ponderous, as to sink in Water, which renders it very valuable for divers Utensils.

All the Varieties of the Tree or large Box, are proper to intermix in Clumps of Evergreens, &c. where they add to the Variety of such Plantations. These may be propagated by planting the Cuttings in April in a shady Border, observing to keep them water'd until they have taken Root, and may be afterward transplanted into Nurseries till they are fit for the Purposes intended. The best Season for removing these Trees, is, in April or September, though, indeed, if Care be taken to take

them up with a good Ball of Earth, they may be transplanted almost at any Time, except in the Middle of Winter. These Trees are a very great Ornament to cold and barren Soils, where few other Things will grow. They may also be propagated by laying down the Branches, or from Seeds.

The Dwarf-kind of Box is used for bordering of Flower-beds, or Borders; for which Purpose it far exceeds any other Plant, it being subject to no Injuries from Cold or Heat, and is of a long Duration, is very easily kept handsome, and by the Firmness of its Rooting keeps the Mould in the Borders from washing into the Gravel-Walks more effectually than any Plant whatever. This is increas'd by parting the Roots, or planting the Slips; but as it makes so great an Increase of its self, and so easily parts, it is hardly worth while to plant the Slips that have no Roots; but it is now become so common, that it may be purchas'd from the Nurseries at a cheap Rate.

The manner of planting this in Edgings, &c. is so well understood by every working Gardener, that it would be needless to mention any thing of that kind here.



C A

CABBAGE; vide Brasica.

CABINET; in a Garden, is a Conveniency which differs from an Arbour, in this; that an Arbour or Summer-house is of a great Length, and arch'd over Head in the Form of a Gallery; but a Cabinet is either square, circular, or in Cants, making a kind of a Salon to be set at the two Ends or in the Middle of a long Arbour.

CALAMINTHA; [*καλαμίνθα*, of *καλή* fair or beautiful, and *μινθά* Mint, because the Virtues are like that of Mint, or because *Calamint* was a Damsel who dy'd for Love.] *Calamint*.

The Characters are;

It hath a long tubulous Flower, which opens at the Top into two Lips; the upper Lip or Crest is roundish, and divided into two Segments; the lower Lip or Beard is divided into Three: These Flowers are produc'd from the Joints of the Stalks at the Footstalks of the Leaves, in Bunches, upon pretty long Pedicles or Footstalks.

The Species are;

1. *CALAMINTHA*; *vulgaris*; vel *officinarium Germania*. C. B. The common Calamint.
2. *CALAMINTHA*; *pulgei odore*; *foliis latioribus*. H. L. Broad-leav'd Calamint, with a Pennyroyal Smell.
3. *CALAMINTHA*; *magno flore*. C. B. Calamint with large Flowers.
4. *CALAMINTHA*; *incana*; *ocymi foliis*. C. B. Hoary Calamint, with Leaves like Basil.

The first of these Sorts is found wild in many Parts of England; but may be propagated

gated in Gardens, by sowing the Seeds in Spring, or parting the Roots; it will grow in almost any Soil or Situation. This is the Sort commonly used in Medicine; tho' the second Sort hath of late prevail'd in the Markets. The second and third Sorts may be propagated in the same manner as the first, and are equally as hardy. The fourth Sort is somewhat tenderer, and should be kept in Pots, and shelter'd in Winter: This is increas'd by planting Cuttings in any of the Summer Months.

CALF'S-SNOUT; *vide* Antirrhinum.

CALTHA. Marygold.

The Characters are;

It hath a radiated discous Flower; the Petals of the Flower are for the most part crenated; the Seeds are crooked and rough; those which are outermost are long, and those within are short: the Leaves are long, intire, and succulent.

The Species are;

1. **CALTHA**; *vulgaris*; *flore citrino*. C. B. The common Marygold.

2. **CALTHA**; *vulgaris*; *flore pallido*. C. B. The pale-colour'd Marygold.

3. **CALTHA**; *polyanthos*; *major*. C. B. The large double Marygold.

4. **CALTHA**; *polyanthos*; *maxima*. C. B. The largest double Marygold.

5. **CALTHA**; *minima*; *J. B.* The smallest Marygold.

6. **CALTHA**; *media*; *folio longo*; *prolifera*. Boerb. Ind. The Childing Marygold.

7. **CALTHA**; *Africana*; *flore intus albo, extus violaceo*. Tourn. The African Marygold with Flowers that are white within, and of a Violet Colour on the outside.

8. **CALTHA**; *Africana*; *flore intus albo, extus leviter violaceo*; *semine plano*; *cordato*. Boerb. Ind. African Marygold, with Flowers white within, and of a soft Violet Colour without, and flat Heart-shap'd Seeds.

9. **CALTHA**; *Africana*, *foliis croci, angustis, florum petalis externè purpurascens, internè albis*. Boerb. Ind. African Marygold with narrow Leaves like Saffron, and the Petals of the Flower white within, and purple without.

The six Sorts first mention'd are very hardy Plants, and may be sown in Beds or Borders of common Earth in any Part of the Garden. They are all Annuals: yet if their Seeds are suffer'd to fall to the Ground, they will supply you, without the Trouble of sowing them. But in order to keep the Sorts distinct, we should carefully save the Seeds of each, and sow them in the Spring, especially the Largest, Double, and Childing Kinds, which are often kept in Gardens for the Beauty of their Flowers, the other are only sow'd for Pot-herbs. The Seventh and eighth Sorts are very pretty Annual Plants, and should be sowed in a warm Border, and in a light Soil, and may be, while young, transplanted into other Parts of the Garden, where they are to remain: but if they are grown large before you remove

them, it is a great Hazard if they grow again. These Plants will continue producing great Quantities of beautiful Flowers most part of the Summer; and if the Season is not too cold and wet, will ripen their Seeds very well; which you must be careful to gather when ripe, for they soon fall to the Ground.

The ninth Sort is an abiding Plant, and never produces any good Seeds in this Country; but may be propagated by Cuttings, which should be planted in Pots of good light Earth, and plung'd into a gentle Hot-Bed, refreshing them often with Water, and shading them from the great Heats of the Sun, until they have taken Root; when you must harden them by degrees, to endure the open Air. This Plant must be Hous'd in Winter with the *Ficoides*, &c. but must have as much free open Air as possible when the Weather is mild; for if it is kept too close, it is very subject to grow mouldy and rot away, it continues flowering the greatest part of the Year, for which it is very valuable, and often produces its Flowers in the middle of Winter, when few other Flowers appear.

CALTHA PALUSTRIS; *vide* Populago.

CALYX [with Botanists, signifies the Cup of a Flower before it opens, or the soft Husk or Skin in which a Flower first of all, and afterwards the Seeds of Herbs and Fruit of Trees, is cover'd.] Lat. the Cup inclosing or containing the Flower.

CAMPANIFORUM Flowers, [of *Campana* a Bell; and *Forma*, Lat. Shape:] such Flowers as in Shape resemble a Bell.

CAMPANULA [signifies a little Bell, as tho' *parva Campana*, Lat. so called, because the Flowers resemble a little Bell. It is also call'd *Trachelium*, of *τραχέλιος*, roughness; either because it is a very rough Plant, or because it is good for Inflammations of the Tracheal Artery. It is also call'd *Uvularia*, because it is good against Diseases of the Uvula; and also *Cervicaria*, of *Cervix* the Neck, because it heals Diseases of the Neck. It is likewise call'd *Pentagonia*, because the Flowers contract themselves into five Angles, especially in the Evening.] Bell-Flower.

The Characters are;

The Flower consists of one Leaf, is shap'd like a Bell, and is, before blown, of a pentagonal Figure; and, when fully open'd, is cut into five Segments at the Top. The Seed-vessel is, for the most part, divided into three Cells, each having a Hole at the Bottom, by which the Seed is emitted.

There are a vast Number of Species of this Plant, which to enumerate in this Place would be tedious: I shall only select some of the most beautiful Kinds which are best worth propagating in a Flower-garden, and omit the other less-valuable Sorts.

1. **CAMPANULA**; *pyramidata*; *altissima*; Tourn. The tallest pyramidal Bell-flower.

2. CAM-

2. CAMPANULA; *perficafolia Lobelii*; *flore caruleo*. Mor. Hist. The blue Peach-leav'd Bell-flower.

3. CAMPANULA; *perficafolia*; *flore albo*. Mor. Hist. The white Peach-leav'd Bell-flower.

4. CAMPANULA; *perficafolia*; *flore pleno*. Tourn. The double Peach-leav'd Bell-flower.

5. CAMPANULA; *perficafolia*; *flore albo, pleno*. Tourn. The double white Peach-leav'd Bell-flower.

6. CAMPANULA; *hortensis*; *flore & folio oblongo*. C. B. Garden Bell-flower with oblong Leaves and Flowers; commonly call'd Canterbury Bells.

7. CAMPANULA; *hortensis*; *flore & folio oblongo*; *flore albo*. C. B. White Canterbury Bells.

8. CAMPANULA; *hortensis*; *flore & folio oblongo*; *flore variegato*. The strip'd Canterbury Bells.

9. CAMPANULA; *vulgatior*; *foliis urtica*; *vel major & asperior flore duplici caruleo majore*. Boerb. Ind. Large Nettle-leav'd Bell-flower, with large double blue Flowers.

10. CAMPANULA; *vulgatior*; *foliis urtica*; *vel major & asperior flore duplici albo*. H. R. Par. Large Nettle-leav'd Bell-flower, with double white Flowers.

11. CAMPANULA; *Canariensis*; *Atriplicis folio*; *tuberosâ radice* Tourn. Canary Bell-flower with Orach Leaves, and a tuberosé Root.

12. CAMPANULA; *minor*; *Americana*; *foliis rigidis*; *flore caruleo parulo*. H. L. Dwarf American Bell-flower, with rigid Leaves, and blue Flowers.

13. CAMPANULA; *minor*; *Americana*; *foliis rigidis*; *flore albo*. H. H. L. Dwarf American Bell-flower, with rigid Leaves, and white Flowers.

14. CAMPANULA; *radice esculentâ*; *flore caruleo*. H. L. Blue Bell-flower, with edible Roots, commonly call'd Rampions.

The first Sort is commonly cultivated to adorn Chimnies, Halls, &c. in the Summer-season; for which Purpose there is no Plant more proper, it producing sometimes eight, ten, or twelve Branches, which will grow four or five Feet high, and produce large Quantities of beautiful Flowers, almost the whole Length of the Stalks, which, if kept from Rain and Sun, will continue in Beauty for a long time; and if the Branches are regularly spread flat to Sticks, makes a very fine Appearance.

This Plant is propagated either by sowing the Seeds in March, in a Bed of light undung'd Soil, or by parting the Roots; the latter Method being the most expeditious, is commonly practis'd; for every Dug taken from the Roots in September or March, will grow, if rightly manag'd: But the Roots which are rais'd from Seeds, will make the strongest Bloom; for which Reason, you should every Year sow of the Seeds, to have a Succession of these Roots for Boom, notwithstanding they are commonly three or four Years before they flower: we should

therefore transplant the young Plants into Nursery-beds the September after sowing, which Beds should be made of a light Soil, rather dry than wet: The Distance they should be planted at, is six Inches square: And if in hard frosty Weather you cover the Bed with Mats, it will greatly strengthen the young Roots; in these Beds they may remain until the third Year after sowing; at which time, if you find the Roots are strong, and promise well for flowering, in September you should take them up, and plant them into Pots of light Soil; and if you have the Conveniency of a Glass-Frame to shelter them in Winter from great Rains and severe Frosts, they will be vastly the stronger for it: For altho' they require frequent Waterings in Summer-time, yet too much Wet in Winter is apt to rot them; for their Roots are succulent and milky: therefore, if you have no such Conveniency, you must lay the Pots on one side in very wet Weather, and in a great Frost set them under a warm Wall, Pale, or Hedge, and cover them with Pease-haulm, &c. observing to lay a little old Dung round the Pots, to guard their Roots from the Frost. If this Care be taken, the Flowers will sufficiently recompence for the Trouble, in their Numbers and Largeness.

The Peach-leav'd Bell-Flowers may be rais'd from Seeds, in the same manner; or be increas'd, by parting their Roots in Autumn, which is the most expeditious Method: These are very hardy, and may be planted in open Beds or Borders, where they will flower very strong, especially if their Roots are taken up and parted every other Year; for otherwise, the Number of Heads will render their Stems weak, and the Flowers small.

The Canterbury Bells are biennial, seldom lasting longer than the second Year; these therefore are only rais'd, by sowing their Seeds, the best Season for which is in the Beginning of April, and in June the Plants will be fit to transplant; at which time you should prepare a Bed or two in a shady Situation, where you must plant them at about six Inches Distance every way; and in September following you may plant them out into the Borders of the Flower-Garden, where they will flower the May following; and when they have ripened, their Seeds will die; therefore you must sow every Year, to have a Supply of fresh Roots.

The two Dwarf American Kinds are only propagated by Off-sets, their Seeds seldom ripening with us; they are hardy, and will endure in the open Air, provided they are planted in a dry Soil, and a warm Situation: The best Season for parting their Roots, is in April; but they must not have too rich a Soil.

The Canary Campanula is one of the most beautiful Plants of the Green-house, it producing its Flowers in the Depth of Winter, and continuing them through the Months of December, January, and February. This Plant is propagated by parting its Roots, the Season for which is in Jun, when the Stems are quite decay'd; and in doing of it, great Care should

should be taken, not to break or bruise their Roots, which would endanger their decaying: The Soil in which these Roots should be planted, must be one third fresh Earth, a third part Sand, and the rest Lime-Rubbish; this should be well mix'd and screen'd, and, if laid together half a Year before it is used, that it may incorporate, it will be the better.

When you plant the Roots, give them a little Water to settle the Earth about them; but afterwards let your Waterings be very sparingly done, and but seldom repeated until their Stems begin to advance; after which, they must have it a little freely: For want of this Caution, many of these and other Flower-roots which are kept in Pots are destroy'd; for it is impossible to suppose that a Root which is intirely at Rest, and destitute of Leaves, should be capable of discharging any Quantity of Moisture; therefore let this Caution be constantly observ'd. The Stems of the Flower will begin to appear in August; and if the Roots are strong, will rise to eight or nine Feet in height; and in November, or sooner, will begin to shew its beautiful Flame-colour'd Flowers. When these Stems begin to advance, we should remove the Plant into Shelter, to guard it from Morning Frosts, or great Rains; and as the Weather grows colder, it must be remov'd into a good Green-house, where it should have as much free Air as possible in open mild Weather. This Plant will require the same Proportion of Heat as is allotted for the *Ficoides*, and will thrive in the same House better than amongst Orange-trees, &c.

The Nettle-leav'd Bell-Flowers are very hardy, and may be increas'd by parting their Roots either in Spring or Autumn, and are proper for large open Borders.

The *Kampion* is propagated in the Kitchen-Garden, for its Root, which was formerly in greater Esteem in England than at present, altho' the French are still very fond of it: The Seeds of this Plant should be sown in March, in a Bed of light dry Earth, as thin as possible; and in May, when the Plants are come up, hoe them out, leaving them about four Inches Square; and during the Summer keep them clear from Weeds, and the Winter following they will be fit for Use.

CAMPHORA: [This is call'd *Caphura* or *Camphora* by the Latins, and *Capur* and *Caphur* by the Arabians: This various Pronunciation of the Arabians is taken from that frequent Confusion and Affinity, with them, between the Letters P and F. But this Pronunciation is maimed; for no P or F is in Use, but only *es*, which is changed into *as*, by the Invention of the hard Point call'd *Tesdit*: From whence the Latins have made *Camphora*, by putting in the Letter M, probably for the better Sound, as the Arabians themselves are wont to do, who often-times insert the Consonant M, when the Point *Tesdit* occurs. From whence this Word takes its Original is not very clear: Many will have it to be a Hebrew Word, which in the first Conjugation signifies to dawb over

with Pitch; but not properly with our Pitch, but with some certain glutinous Matter; and in the second Conjugation, to expiate or make an Atonement: Hence some will have it *Copher*, of which mention is made in Solomon's Song; and there they will have it to be an Indian Word, and yet to come from the Verb *Capbar* to descend, which was of great Use on Account of its Clamminess and Tenaciousness in joyning, glewing, and dawbing the Planks of Ships, and the Stones of Buildings. This Tree is call'd *Camphora officinarum*, or *Camphire* of Japan.] The Camphire-Tree.

The Characters are;

It hath Leaves like those of the Pear-Tree, but are full of Ribs, which grow alternately upon the Branches: The Flowers consist of one Leaf, which is divided into five or six Segments: The Fruit is shap'd like a Nut; the Shell is tender, and the Kernel bifid.

CAMPHORA; officinarum. C. B. The Camphire-Tree.

The Authors that have treated of this Tree suppose there are two Sorts of it, one of which is a Native of the Isle of Borneo, and is the Tree from whence the best Camphire is taken, which is suppos'd to be a Natural Exudation from the Tree produced in such Places where the Bark of the Tree has been wounded or cut. The other Sort is a Native of Japan, which Dr. Kempfer describes to be a Kind of Bay, bearing black or purple Berries, and from whence the Inhabitants of the Province of *Satzuma* and the Island of *Gosho* prepare their Camphire, which is procur'd by making a simple Decoction of the Root and Wood of this Tree cut into small Pieces: But this Sort of Camphire (he says) is extremely cheap, being in Value eighty or an hundred times less than the true Bornean Camphire.

This Tree is at present very rare in Europe, and is only increas'd by laying down the Branches, which are commonly two Years before they take Root, so as to be fit to remove: It requires a light Soil, and frequent Waterings in warm Weather, but in Winter you must do it sparingly: It must be kept in a moderate Warmth in Winter, but in Summer may be expos'd to the open Air in a well-shelter'd Place.

CAMPION; vide *Lychnis*.

CANDLE-BERRY-TREE; vide *Gale*.

CANDY-TUFT; vide *Thlaspi*.

CANNA INDICA; vide *Cannacorus*.

CANNABIS [*κασσις*, Gr.] Hemp.

The Characters are;

It hath digitated (or finger'd) Leaves, which grow opposite to one another: The Flowers have no visible Petals: It is a Male and Female, in different Plants.

CANNABIS; sativa. C. B. The Manured Hemp.

This Plant is propagated in the rich Fenny Parts of *Lincolnshire*, in great Quantities, for its Bark, which is so useful for Cordage, Cloth, &c. and the Seeds afford an Oyl which

F f

which is used in Medicine. The Manner of Propagating it is so well known, that it would be needless to insert it in this Place.

CANNACORUS, [so call'd of *Canna* a Stem; and *Acorus*, because it has a Root and Leaves like the *Acorus*] The Indian Reed.

The Characters are;

It hath a knobbed tuberose Root: The Leaves are long and nervous: The Flower consists of one Leaf, is tubulous, and cut into six Segments; these are succeeded by roundish membranaceous Vessels, which are divided into three Cells, each containing two or three round hard Seeds.

The Species are:

1. **CANNACORUS**; *latifolius*; *vulgaris*. Tourn. The common broad-leav'd Indian Reed, with pale Flowers.

2. **CANNACORUS**; *latifolius*; *vulgaris*; *foliis variegatis*. The common Indian Reed, with strip'd Leaves.

3. **CANNACORUS**; *flor. luteo punctato*. Tourn. The yellow-spotted Indian Reed.

4. **CANNACORUS**; *flor. coccineo*; *splendens*. Tourn. The fine Scarlet-colour'd Indian Reed.

5. **CANNACORUS**; *amplissimo*; *folio*; *flor. rubro*. Tourn. The largest-leav'd Indian Reed, with reddish-colour'd Flowers.

6. **CANNACORUS**; *angustifolius*; *flor. flavescente*. Tourn. Narrow-leav'd Indian Reed, with yellow Flowers.

These Sorts are all propagated by Seeds, which must be sown on a Hot-bed in March, and afterwards should be transplanted into Pots fill'd with good rich Earth, and, during the Summer-season, must be plentifully water'd: These Plants, thus manag'd, will many times produce Flowers the first Season; but 'tis not till the second Year that they blow strong: In order to which, you should house them before the Frost pinches their Leaves, observing to give them but little Water in the Winter, and keep them intirely from the Frost: In May following, prepare a good rich Bed of Earth, and turn your Plants out of the Pots into this Bed, being careful not to disturb the Earth about their Roots, giving them Water plentifully in dry Weather; and when your Roots have once fasten'd themselves into this Bed, they will grow vigorously, and produce many strong Stems, which will flower much stronger than those kept in Pots, and ripen their Seeds very well.

The Scarlet Blossom is by far the most beautiful Kind; but a Mixture of the yellow-spotted Sort will look very agreeable; but the common pale-colour'd Sort is hardly worth keeping, unless in Botanic Collections.

These Sorts may be also increas'd by parting their Roots in the Spring, but these Plants seldom flower so well as Seedlings: And since the Seeds are so easy to be obtain'd, 'tis hardly worth practising, unless for the strip'd-leav'd Sort, which can be no other Way increas'd. The Inhabitants of America call this Plant *Indian-shot*, and say, the Indians make Use of this Seed instead of Shot, to shoot Wild-fowl, &c.

There is also another Species of this Plant, the Root of which is the *Curcuma* of the Shops; but this I have not as yet seen in the English Gardens.

CAPERS; *vide* Capparis.

CAPILLAMENTS; [*Capillamenta*, Lat.] the Strings or Threads about the Roots of Plants.

CAPILLARY Plants; [of *Capillaris*, Lat. of or like Hair.] Such Plants as have no main Stalk or Stem, but grow to the Ground as Hairs to one's Head.

CAPITULUM; *i. e.* a little Head; the Head or Top of any flowering Plant.

CAPNOIDES; [so call'd from the Greek *καπνός* Fumitory, and *ειδος* Shape, on account of its Resemblance to Fumitory.] Podd'd Fumitory.

The Characters are;

The Leaves and whole Face of this Plant is like Fumitory, but the Style of the Flower becomes a long taper Pod, which contains many round shining Seeds.

CAPNOIDES. Tourn. Podd'd Fumitory.

This is a pretty annual Plant, which may be sown in an open Border in the Spring of the Year; and when the Plants are come up, they may be remov'd and planted in the Borders of the Flower-Garden, where they will make a pretty Shew for two or three Months together: The Seeds of this Plant, if suffer'd to shed upon the Ground, will furnish you with Plants enough, without giving you the Trouble to sow it any more.

CAPNORCHIS; Indian Bulbous-rooted Fumitory.

The Characters are;

This hath the whole Face of Fumitory: The Root is sometimes tuberose, sometimes scaly, and at other times bulbous; the Flower consists of two Leaves, is of an anomalous Figure, and hangs downward; the Pods are like those of Shepherd's-Pouch.

CAPNORCHIS; *Americana*. Boerb. Ind. American Bulbous-rooted Fumitory.

This Plant is propagated by parting its Roots, or from Seeds: It is hardy enough to endure our common Winters in the open Ground: The Flowers are somewhat like those of *Fumitory*, and tho' none of the most beautiful Plants, yet deserves a Place in a good Garden.

CAPPARIS; [so call'd of *Capite*, Lat. the Head, because the Calices or Cups of these Shrubs resemble little Heads.] The Caper-Bush.

The Characters are;

Its Flowers consist of four Leaves; which are expanded in Form of a Rose; the Fruit is fleshy, and shap'd like a Pear, in which is contain'd many roundish Seeds.

There is but one Species of this Plant in England at present, that I know of, which is,

CAP-

CAPPARIS; *non spinosa*; *fructu majore*. C. B. The large-fruited Caper, without Thorns.

This Shrub chiefly delights in Rubbish, and commonly grows upon old Walls and Buildings, and is, with Difficulty, kept in Gardens, although hous'd in Winter: Whereas there is a Bush of this kind, now growing in a Hole of a decay'd Wall, in the Gardens of *Camden-House* at *Kenington*, which hath endured several Winters without any Shelter or Covering, and annually produces many beautiful Flowers, and sometimes, in good Seasons, will produce Seeds, though I don't remember ever to have seen them perfectly ripe.

The Seeds of this Plant may be easily obtain'd from *Tholouse* or *Leghorn*, and may be sown upon old Walls and Buildings, where they will insinuate their Roots between the Bricks, and endure for many Years. The Buds of these Flowers, before they open, are pickled for Eating.

BEAN-CAPER; *vide* *Fabago*.

CAPREOLATE Plants; [of *Capreolus*, L. the Tendril of a Vine.] Such Plants as turn and climb along the Surface of the Ground, by means of Tendrils.

CAPRIFOLIUM; [takes its Name of *Caper* a Goat, and *Folium* a Leaf, Lat. because Goats eat the tender Leaves of this Plant] *Honeysuckle*.

The Characters are;

It hath a climbing Stalk, which twists its self about whatsoever Tree stands near it: The Flowers are tubulous and oblong, consisting of one Leaf, which opens toward the Top, and is divided into two Lips; the uppermost of which is again divided into two, and the lowermost into many Segments; the Tube of the Flower is bent, somewhat resembling a Huntsman's Horn: They are produc'd in Clusters, and are very sweet.

The Species are;

1. **CAPRIFOLIUM**; *non perfoliatum*, *floribus albis*. The Wild or English White Honeysuckle,

2. **CAPRIFOLIUM**; *non perfoliatum*, *flore interius albo, rubro externè*. Boerh. Ind. The English red Honeysuckle.

3. **CAPRIFOLIUM**; *non perfoliatum*, *foliis sinuosis*. Tourn. Oak-leav'd Wild Honeysuckle.

4. **CAPRIFOLIUM**; *non perfoliatum*, *foliis sinuosis & variegatis*. The Strip'd Honeysuckle with cut Leaves.

5. **CAPRIFOLIUM**; *non perfoliatum*, *foliis ex luteo variegatis*. The Common Honeysuckle with Yellow Strip'd Leaves.

6. **CAPRIFOLIUM**; *Italicum*, *perfoliatum præcox*. Broff. The French or Early White Honeysuckle.

7. **CAPRIFOLIUM**; *Italicum*. Dod. The Italian Honeysuckle.

8. **CAPRIFOLIUM**; *Germanicum*, *flore rubello serotinum*. Broff. Late Red Honeysuckle.

9. **CAPRIFOLIUM**; *Germanicum*, *floribus speciosius*. Dutch Honeysuckle.

10. **CAPRIFOLIUM**; *perfoliatum*, *sempervirens*, *floribus speciosius*. Ever-green Honeysuckle.

The first, second, and third Sorts of *Honeysuckles* are found growing in the Hedges, in many Parts of *England*: Indeed, the third Sort is seldom found, and I believe is no more than an accidental Variety of the two former. I found one Plant of this Kind in the Woods near *Dulwich*, which I planted in the Physick-Garden, where it now grows, and many of the Branches still continue to produce indented Leaves; but the extreme Parts of the Tree, and all the vigorous Shoots, produce whole Leaves; so that the Variation from the common Sort is but small. The two Strip'd Sorts are also Varieties of the common, one having whole, the other indented Leaves. The Early White, *Italian*, Late Red, and *Dutch* Sorts, are Foreigners; but have been more cultivated in the Nurseries about *London*, than those which are of our own Growth, and are much commoner in the Gardens than those. The Early White is the first Sort that flowers, commonly beginning in *April*; this is succeeded by the *Italian*: Then the *Dutch* and Late Red Sorts follow; the latter of which, during the time of flowering, is the most beautiful of all the Kinds; for its Flowers are produced in very close Bunches, and every Shoot of the Tree produces many Bunches, which flowering all together, renders it a very fine Shrub: but this seldom lasts more than a Fortnight in Beauty; whereas the *Dutch* Sort, which produces its Bunches but thinly (its Branches growing more diffused) continues flowering until prevented by frosty Weather. The *Ever-green Honeysuckle* begins to produce its Flowers at the Beginning of *June*, and often continues flowering 'till *Michaelmas*, which, together with its ever-green Leaves, renders it a very valuable Shrub.

All these Sorts of *Honeysuckles* are propagated by laying down their Branches in the Spring; which by *Michaelmas* following (if they have been supply'd with Water) will have taken Root, so as to be fit to remove, which should be into Nursery-beds, for a Year or two the better to train them up, either for Headed-Plants, or for Creepers to plant against Trees, Walls, Pales, &c. which in two Years time, at most, will be fit for any of those Purposes; or they may be propagated by planting Cuttings of the young Shoots, either at *Michaelmas*, or early in the Spring of the Year, in a shady Border, where they may continue 'till the *Michaelmas* following, when they may be transplanted into Nursery-beds, (as was before directed:) But the *Ever-green Honeysuckle* is difficult to encrease this Way, therefore it would be better to propagate it by Layers.

These Shrubs are very great Ornaments to small Quarters of Flowering Shrubs, when train'd up to regular Heads, and the different Varieties being intermix'd therewith: Their long Continuance in Flower, together with the Beauty and Sweetness of their Flowers, renders

renders them as valuable Shrubs for such Purposes as any we have; and they are no less valuable for planting against the Stems of old Trees in Groves or Avenues, where, if they are not too much overshadowed by the Trees, they will thrive and flower exceedingly.

The best Season for cutting these Trees, to keep them in a regular Form, is about *Michaelmas*, soon after they have done flowering, that their Wounds may heal before Winter: And this Work is best perform'd with a Knife, observing to cut behind a Leaf-Bud; for how long soever the Shoot is left beyond, it decays down to the Bud, and thereby becomes unsightly. They are all extreme hardy, except the *Ever-green*, which is suppos'd to be an *American Plant*; and is sometimes, in very severe Winters, apt to suffer by the Frost, if planted in a Situation too much expos'd.

CAPSICUM; [takes its Name of *Capsa*, *Lat.* a Chest, because the Seeds of this Plant are included, as it were, in a little Chest; or else of *καψω*, to Bite, because it is a burning pungent Plant: It is also call'd, *Piper Indicum Americanum Brasiliannum*, from its very sharp Taste; for if you eat the raw Fruit, the hot biting Taste will last in the Mouth the whole Day, nor can it easily be got out.] *Guiney Pepper*.

The Characters are;

The Flowers consist of one Leaf, and are expanded like those of *Nightshade*; the Fruit is soft, fleshy, and membranous, and divided into two or more Cells, in which are contained many flat *Kidney-shap'd* Seeds.

The Species are;

1. **CAPSICUM**; *siliquis longis, propendentibus*. *Tourn.* Capsicum with long hanging Pods.
2. **CAPSICUM**; *siliquis recurvis*. *Dod.* Capsicum with long Pods which turn up at the End.
3. **CAPSICUM**; *latifolium, mali Aethiopici fructu magno, compresso, striato, Americanum*. *Pluk.* Broad-leav'd Capsicum, with long compress'd striated Pods, commonly call'd, *Bonnet Pepper*.
4. **CAPSICUM**; *Africanum, fructu pyramidalis pendulo rugosissimo*. African Capsicum, with pyramidal rough, hanging Pods.
5. **CAPSICUM**; *Africanum; fructu pyramidalis rugosissimo, plerumque erecto*. African Capsicum, with pyramidal rough Pods, for the most part growing erect.
6. **CAPSICUM**; *fructu non acri, rugoso longo, pendente rubro*. *Tesochilli. Hern.* Capsicum, with long hanging red Pods, which are not hot.
7. **CAPSICUM**; *fructu Cordiformi, plerumque nutante rubro*. Capsicum, with Heart-shap'd red Pods, for the most part hanging downwards.
8. **CAPSICUM**; *fructu Pyramidato, crasso, plerumque erecto rubro*. Capsicum, with pyramidal thick red Pods, for the most part growing upright.
9. **CAPSICUM**; *fructu oblongo, nunc erecto, nunc nutante, rubro*. Capsicum, with oblong

red Pods, growing sometimes erect, and sometimes hanging.

10. **CAPSICUM**; *fructu rotundo, majore, nunc erecto, nunc nutante rubro*. Capsicum, with large round red Pods, growing sometimes erect, and sometimes hanging.

11. **CAPSICUM**; *fructu flavo, pyramidato, oblongo, nunc erecto, nunc nutante*. Capsicum, with oblong pyramidal yellow Pods, growing sometimes erect and sometimes hanging.

12. **CAPSICUM**; *fructu Cordiformi, nunc erecto, nunc nutante flavo*. Capsicum, with Heart-shap'd yellow Fruit, growing sometimes erect, and sometimes hanging.

13. **CAPSICUM**; *fructu Olivario erecto*. Upright Olive-shap'd Capsicum.

14. **CAPSICUM**; *fructu parvo pyramidalis erecto rubro*. *Sloan.* Capsicum, with small red Pods growing erect, call'd by the Inhabitants of the *West-Indies*, *Barbary-Pepper*.

15. **CAPSICUM**; *fructu parvo, rotundo, acerrimo*. *Sloan.* Capsicum, with small round Pods which are very hot, call'd by the Inhabitants of the *West-Indies*, *Bird-Pepper*.

16. **CAPSICUM**; *Americanum, fructu rotundo, Cerasorum formâ*. *Pluk.* American Capsicum, with round Cherry-shap'd Fruit.

17. **CAPSICUM**; *Americanum, latifolium, fructu oblongo, erecto, candido*. Broad-leav'd American Capsicum, with oblong white Pods growing erect.

18. **CAPSICUM**; *fructu maximo, oblongo rugoso plerumque nutante rubro*. Capsicum, with large oblong, red rough Pods, for the most part hanging downwards.

These Sorts of *Capsicums* are sown in many curious Gardens with other annual Plants, in Hot-beds, and require to be treated after the same manner as was directed for the *Amaranthus*, and do, in the *Autumn* Season, make a very pretty Diversity, being intermix'd therewith: They are all tolerably hardy, and may be planted abroad, towards the latter End of *May*, or the Beginning of *June*, either in Pots or open Borders, where they will ripen their Fruits very well, except the 3d, 13th, 14th, 15th, 16th, and 17th Sorts, which are tenderer, and must be brought forward under Glasses, otherwise their Fruit will not come to good: The 13th, 14th, and 15th Sorts will remain for several Years, and form handsome Shrubs, if you take proper Care to preserve them in the Stove in the Winter; during which Season their Fruits will remain and ripen, and appear very beautiful. Indeed, I believe, all the Sorts may be preserv'd over the Winter, were we to take off a Part of their Fruits before they are grown so big as to exhaust the Strength of the Plant, and observe to house them in time: But as they perfect their Fruit so easily in one Summer, it is seldom practis'd but with those Sorts that do not so readily ripen their Seeds.

The Fruit of these Plants, tho' at present of no great Use in *England*, yet affords one of the wholesomest Pickles in the World, if they are gather'd young before their skins grow tough. The Inhabitants of the *West-Indies*

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eat great Quantities of this Fruit raw, not only while it is green, but also when it is fully ripe; at which time it is so very acrid as to cause an extraordinary great Pain in the Mouth and Throat of such Persons as are not accusom'd to eat of it.

The Inhabitants of the *West-Indies* make great Use of the *Bird-Pepper*, which they dry and beat to a Powder, and mix with other Ingredients, which they keep by them at all times for Sauce, and use it instead of Pepper; of which they send some of these Pepper-pots to *England*, by the Name of *Cayan Butter* or *Pepper-Pot*, and are by some of the *English* People mightily esteem'd.

CAPSULATE Pods; [of *Capsa*, Lat. a Chest] are the little short Seed-vessels of Plants.

CAPSULATED; inclos'd in any thing, as a Walnut is in its green Husk.

CARACALLA; *vide* *Phascolus*.

CARDAMINDUM; *vide* *Acriviola*.

CARDAMINE; [takes its Name of *Cardamum*, which is call'd *Nasturtium*; hence it is a small Species of *Nasturtium*; or of *Kā*, the Heart, and *śūdrā* to tame, as tho' a Plant restoring the decay'd Strength of the Heart: It is call'd the *Impatient Herb*, because being touch'd, it discharges its Seeds, as it were, with a Spring.] Ladies Smock.

The Characters are;

The Flower consists of four Leaves; which are succeeded by narrow Pods, which when ripe, roll up, and cast forth their Seeds; the Leaves are for the most part wing'd.

The Species are;

1. **CARDAMINE**; *pratensis, magno flore purpurascens*. Tourn. Common Ladies Smock, with purplish Flowers.

2. **CARDAMINE**; *pratensis, magno flore albo*. Tourn. Common Ladies Smock, with white Flowers.

3. **CARDAMINE**; *pratensis, magno flore pleno*. Tourn. The Double Ladies Smock.

The two first Sorts are common in most of the moist Meadows in *England*; they flower the Beginning of May, and although there is no great Beauty in those Flowers, yet I thought proper to mention them, in order to introduce the third Sort, which is a very beautiful Plant, continuing a long time in Flower, and is a very proper Plant for cold North Borders, or a wet Soil, where few others will grow; and hereby we may render the poorest and worst Soil productive of Beauties, did we but carefully attend to the adapting proper Plants for it, and not endeavour to force it to produce Things which require a quite contrary Soil. The first Sort is sometimes used in Medicine.

CARDIACA; [of *Kardia*, Gr. the Heart.] Mother-wort.

This Plant is cultivated in some Gardens for medicinal Use; but since it is a Plant of no great Beauty, I shall not trouble the Reader with any other Account of it, but only that it will grow, if sown in the Spring, in almost any Soil or Situation; and if once suffer'd to shed its Seed on the Ground, will become a very troublesome Weed.

CARDINALS FLOWER; *vide* *Rapuntium*.

CARDUUS; Thistle.

The Characters are;

The Leaves grow alternately on the Branches, and are prickly, and the Heads are for the most part squamose and prickly.

There are several Species of this Plant mention'd in Books of Botany; but since there are few of them that have any Beauty or Use (to us at present known) so I shall mention two or three of the most remarkable Kinds in this Place, and proceed.

1. **CARDUUS**; *albus, maculis notatus, vulgaris*. C. B. The Milky, or Holy Thistle.

2. **CARDUUS**; *nutans*. J. B. The Musk, or Nodding Thistle.

3. **CARDUUS**; *eriocephalus*. Dod. The woolly-headed Thistle.

These Sorts of Thistles grow wild in many Parts of *England*; the first commonly upon the Sea-Coasts, but the second usually upon Arable Land in many Places; the last is less common than either of the former, being found but in few Places in *England*. These, and all the other Sorts of Thistles may be cultivated by sowing their Seeds in the Spring in almost any Soil, and will flower and seed the second Year, and soon after perish, most of them being biennial Plants: The first Sort is sometimes used in Medicine, and is call'd in the Dispensatory *Cardus Maris*.

CARDUUS BENEDICTUS; *vide* *Cnicus*.

CARDUUS FULLONUM; *vide* *Dipsacus*.

CARNATION; *vide* *Caryophyllus*.

CARPINUS; [so call'd of *Carpere*, Lat. to crop, because it may be easily cropp'd, or its Wood is easily cleft.] The Hornbeam or, Hardbeam-Tree.

The Characters are;

It hath Leaves like the Elm or Beech-Tree: The Katkins (or Male-flowers) are plac'd at remote Distances from the Fruit on the same Tree; and the outward Shell of the Fruit is winged.

The Species are;

1. **CARPINUS**. Dod. The common Hornbeam-tree.

2. **CARPINUS**; *foliis ex luteo variegatis*. The strip'd Hornbeam.

3. **CARPINUS**; *seu Ostrya, Ulmo similis, fructu racemoso Lupulo similis*. C. B. The Hop Hornbeam.

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4. *CARPINUS*; *Virginiana, floescens Pluk.*
The Virginian flowering Hornbeam.

The first of these Trees is often cultivated in the Nurseries to make Hedges for Wildernesses and Orangeries; but of late it hath not been so much used for that Purpose, the decay'd Leaves of the Tree continuing on all the Winter, as do those of the Oak, rendering them very unsightly in a Pleasure-Garden, which, together with the perpetual Litter their Leaves make, have almost brought them into Disuse for this Work, unless in large Wildernesses, where the Hedges are train'd up to a great Height, for which Purpose there is no Tree more useful, it being a very tonfile Plant, and may be kept thick from the Bottom to the Height of eighteen or twenty Feet, and will resist the Violence of strong Winds the best of any of the deciduous Trees, and is of speedy Growth. The Timber of this Tree is very tough, and flexible, and is of excellent Use to the Turners, as also for making Mill-cogs, Heads of Beetles, &c. and is very good Fire-wood.

This Tree may be rais'd from the Seeds, which should be sown early in the Autumn in a shady Situation, where they will remain in the Ground until Spring, and often till the second Year before they appear; for which Reason it is generally propagated by Layers, which is the most expeditious Method: The Layers should be laid in Autumn, and will have taken sufficient Root to be transplanted the Autumn following; at which Time they should be transplanted into a Nursery for two or three Years, where, if they are design'd for Hedges, their under Branches should not be taken off, but the Trees train'd flat for that Purpose. These Trees are very proper to make Hedges round the Quarters of Exotick Trees and Shrubs, their Leaves abiding till the Spring before they fall off, will greatly fence off the cold Winds from the Quarters, and what Leaves do fall away in Autumn should be suffer'd to remain upon the Surface of the Ground until Spring, which will keep the Frost from penetrating so deep into the Ground as it would were the Ground intirely bare.

This Tree will grow upon cold barren expos'd Hills, and in such Situations that few other Trees will, so that it may be cultivated to great Advantage in such Places.

The Hop-Hornbeam sheds its Leaves in Winter, with the Elm, and other deciduous Trees. This Tree, though but lately known in England, yet is very common in Germany, growing promiscuously with the common Sort. This is much preferable to the common Sort for Hedges in a Pleasure-Garden, upon the Account of its quitting its Leaves, with other Trees, and thereby doth not make so much Litter in the Spring as the other, and will cut full as well.

The Virginian flowering Hornbeam is still less common than the last, and only to be seen in curious Gardens; it is equally as hardy as the other, and may be increas'd by Layers.

CARROTS; vide Daucus.

CARTHAMUS; [so call'd of *καρδαμους*, Gr. to purge, because the Seeds of it are Purging.] Bastard Saffron.

The Characters are;

This Plant agrees with the Thistle, in most of its Characters; but the Seeds of this are always destitute of Down.

CARTHAMUS; officinarum; flore croceo. Tourn. Bastard Saffron, or Saf-flower.

This Plant is very much cultivated in many Parts of Germany for the Dyers Use, and is brought into England from thence; it is there sown in the open Fields in the Spring of the Year; and when come up, they hoe it out thin, as we do Turnips, leaving the Plants, about eight or ten Inches distant every Way: These Plants, as they grow, divide into a great many Branches, each producing a Flower at the Top of the Shoot, which, when fully blown, they cut or pull off, and dry it, which is the Part the Dyers make use of: And this is sometimes mix'd with Saffron; to which (if it be rightly dry'd, and artfully mix'd) it is so alike, as not to be distinguished but by good Judges.

This Plant was formerly cultivated in England, particularly in Gloucestershire, where, they say, it did very well: Tho' I am satisfy'd it must be a very good Season if it ripens Seeds well in England; for the Flower-Heads are so close and compact, that if, in the Season of the Seed's Formation, there happens to be wet Weather, this enters the Blossoms of the Florets, and is seldom dry'd away before the tender Seeds are destroy'd; and altho' the Seeds shall many times appear very fair and good to outward Appearance, yet, upon breaking them, they are hollow, and destitute of Kernels. This Seed is sometimes used in Medicine; therefore such People as purchase it for that Purpose, should be careful that they be found. The Florets of this Plant (which are the Parts the Dyers use) have been sometimes put into Puddings, to colour them; and at the Time when it was cultivated in England, the poorer Sort of People in the Country us'd to gather it for that Purpose, until they put in such Quantities into their Puddings, that it purged them, which occasion'd their leaving it off.

CARUI, [so call'd of *καρι*, Gr. the Head, as tho' good for the Head: but others derive the Name from *Caria*, where the Antients found this Plant.] Caraway.

The Characters are;

It hath winged Leaves, which are cut into small Segments, and are placed opposite on the Stalks, having no Foot-stalk: The Petals of the Flowers are bifid, and shap'd like a Heart; The Seeds are long, slender, smooth, and furrow'd.

The Species are;

1. *CARUI*; *Casalp.* The common Caraway.
2. *CRAUI*; *femine majore.* Vaill. The Large-seeded Caraway.
3. *CARUI*; *foliis tenuissimis*; *Asphodeli radice.* Tourn. The Narrowest-leav'd Caraway, with Asphodel Roots.

4. *CARUI*;

4. CARUI ; *Alpinum*. C. B. Alpine Caraway.

The first of these Sorts is sometimes found wild in England, in rich moist Pastures, especially in Holland in Lincolnshire. The other Sorts have been sent from Abroad, and are only cultivated in curious Gardens of Plants.

These Sorts may be all cultivated by sowing their Seeds in the Spring of the Year in a moist rich Soil ; and when the Plants are come up, they should be hoe'd out to about six Inches square, which will greatly strengthen them, and promote their seeding plentifully : In the Autumn their Seeds will ripen, at which Time the Plant should be cut up, and laid upon Mats to dry ; and then it may be beaten out and dry'd, when it may be put up for Use. These Seeds are used in Medicine, as also in the Confectionary, for making Seed-Cakes, &c. The first Sort only is what's used ; tho' the Seeds of the second seem to be full as good, and are much larger and fairer than the first. The other Sorts are only kept in Collections of Plants, to increase their Numbers.

CARYOPHYLLATA ; [so call'd, because the Root being taken out of the Ground and pounded, early in the Spring, breathes out the fragrant Scent of the Clove-gilliflower. It is by the Italians call'd *Herba Benedicta*, i. e. *Blessed Herb*, on account of its manifold Virtues : Also it has this Name from its Root, because they are very dear. We read nothing of this Name among the Antients ; but the Moderns have so call'd it. Boerhaave says, He does not know whether this Plant was known to the Antients. It is also call'd *Sana Mundi*, as tho' it could heal or cleanse the whole Wrold.] Avens, or Herb-Bennet.

The Characters are ;

It hath pennated (or winged) Leaves, somewhat like those Agrimony : The Cup of the Flower consists of one Leaf, which is cut into ten Segments : The Flower consists of five Leaves, which spread open in Form of a Rose : The Seeds are form'd into a globular Figure, each of which hath a Tail to it : The Roots are perennial, and smell sweet.

The Species are ;

1. CARYOPHYLLATA ; *vulgaris*. C. B. Common Avens.

2. CARYOPHYLLATA ; *montana* ; *flore luteo magno*. J. B. Mountain Avens with large yellow Flowers.

3. CARYOPHYLLATA ; *montana* ; *purpurea*. Ger. Emac. Mountain Avens with purple Flowers.

4. CARYOPHYLLATA ; *montana* ; *flore luteo nutante*. C. B. Mountain Avens with yellow bending Flowers.

5. CARYOPHYLLATA ; *Alpina*, *Chamedryos folio*. Hist. Oxon. Mountain Avens with Germander Leaves.

6. CARYOPHYLLATA ; *vulgaris*, *majoris flore*. C. B. Avens with large Flowers.

7. CARYOPHYLLATA ; *pentaphylla*. J. B. Cinquefoil-Avens.

8. CARYOPHYLLATA ; *Virginiana*, *albo flore minore*, *radice inodora* H. L. Virginian Avens with small white Flowers, whole Roots have no Scent.

The first, third, fourth, fifth, sixth, and seventh Sorts are found growing wild in England, Scotland, and Ireland : but the second Sort was brought from the Alps, and the eighth from Virginia : These Sorts may be all cultivated in a Garden, by transplanting their Roots from the Places of their Growth, into a moist shady part of the Garden, where they will thrive exceedingly ; which is the best Method to procure them, for their Seeds commonly remain two Years in the Ground before they appear. The first Sort (which is that commonly used in Medicine) is so common in England, that it hardly deserves a Place in a Garden ; but the second, third, fourth, and sixth Sorts are worthy a Place in some moist shady Border where few other Things will grow ; and serve to add to the Variety, especially since they require no Care or Trouble in their Culture, but only every Michaelmas to divide and transplant their Roots.

CARYOPHYLLUS ; [so call'd, from their having the Scent of Cloves.] Clove-gilliflowers or Carnations.

The Characters are ;

It hath an intire oblong, cylindrical, smooth Cup, which is indented at the Top : The Petals of the Flower are narrow at Bottom, and broad at the Top, and are for the most part lacinated (or cut) about the Edges : The Seed-vessel is of a cylindrical Figure, containing many flat rough Seeds.

This Genus may be divided into three Classes, for the better explaining them to Persons unacquainted with Botany ; which also will be as necessary for the right Understanding their Culture.

1. CARYOPHYLLUS ; *hortensis*. The Clove-gilliflower, or Carnation.

2. CARYOPHYLLUS, *tennisfolius plumarius*, or Pinks.

3. CARYOPHYLLUS ; *Barbatus*, or Sweet-Williams.

I shall treat of these three Classes singly, that I may the better explain their several Methods of Culture : And first, I shall begin with the Carnation or Clove-gilliflower ; these the Florists distinguish again into four Classes.

The first they call *Flakes* ; these are of two Colours only, and their Stripes are large, going quite through the Leaves.

The second are call'd *Bizarres* ; these have Flowers, strip'd or variegated with three or four different Colours.

The third are call'd *Piquette's* ; these Flowers have always a white Ground, and are spotted (or pounced, as they call it) with scarlet, red, purple, or other Colours.

The fourth are call'd *Painted Ladies* ; these have their Petals of a red or purple Colour on the upper-side, and are white underneath.

Of each of these Classes there are numerous Varieties ; but chiefly of the *Piquette's*, which of late Years have been in greater Esteem than and

any of the other Kinds. To enumerate the Varieties of the chief Flowers in any one of these Classes, would be needless, since every County produces new Flowers almost every Year; so that those Flowers which at their first raising were greatly valu'd, are in two or three Years become so common, as to be of little Worth, especially if they are defective in any one Property. Therefore (where Flowers are so liable to Mutability, either from the Fancy of the Owner, or that better Kinds are yearly produced from Seeds, which, with good Florists, always take Place of older or worse Flowers which are turn'd out of the Garden, to make Room for them) it would be but superfluous in this Place to give a List of their Names, which are generally borrow'd either from the Names and Titles of Noblemen, or from the Person's Name, or Place of Abode, who rais'd it; I shall only beg Leave to mention two or three old-describ'd Sorts, by way of Introduction, and shall then proceed.

1. CARYOPHYLLUS; *atilis, major*, C. B. The Clove-gilliflower.

2. CARYOPHYLLUS; *maximus, ruber*, C. B. The Large Bastard Clove-gilliflower.

3. CARYOPHYLLUS; *maximus, alter, lato, porri folio*. H. R. Par. The Broad-leav'd Carnation or Gilliflower.

The first of these Sorts is the true *Clove-gilliflower*, which hath been for a long time so much in Use for making a Cordial Syrup, &c. of which there are two or three Varieties commonly brought to the Markets, which differ greatly in their Goodness; some of them having very little Scent, when compar'd with the true Sort: The large Kind hath been much plentier some Years since than at present: This used to burst the Pods, and their Petals hang loping about in such a manner, that the People did not care to buy them in the Market, which was the Reason it hath not been cultivated so much of late. The third Sort is only to be found in such small Gardens as raise great Quantities of these Flowers from Seed to supply the Markets in the Spring of the Year: This being a very hardy Kind, and their Leaves being so broad, and the Plants so vigorous, that the People who are wholly unacquainted with these Flowers, make choice of these as the most promising Plants; whereas they seldom have more than four or five Leaves in a Flower, and those are very small, and ill-colour'd: The first of these, *viz.* the *Clove-gilliflower*, is worthy of a Place in every good Garden; but of late there have been so many new Kinds produc'd from Seeds, which are very fine and large, that most of the old Sorts have been excluded the Gardens of the Florists.

These Flowers are propagated either from Seeds, (by which new Flowers are obtain'd) or from Layers, for the Increase of those Sorts which are worthy maintaining: But I shall first lay down the Method of propagating them from Seed, which is thus:

Having obtain'd some good Seeds, either of your own sowing, or from a Friend that you can confide in; in the Beginning of *April*,

prepare some Pots, or Boxes (according to the Quantity of Seed you have to sow); these should be fill'd with fresh light Earth, mix'd with very rotten Neats Dung, which should be well incorporated together; then sow your Seeds thereon, (but not too thick) covering it about a Quarter of an Inch with the same light Earth, placing the Pots or Cases so as to receive the Morning-Sun only, till eleven of the Clock, observing also to refresh the Earth with Water so often as it may need it: In about a Month's Time your Plants will come up, and, if kept clear from Weeds, and duly water'd, will be fit to be transplanted in the Beginning of *June*; at which Time you should prepare some Beds (of the same Sort of Earth as was directed to sow them in) in an open airy Situation, in which you should plant them at about three Inches square, observing to water and shade them, as the Season may require, being careful also to keep them clear from Weeds: In these Beds they may remain until the Beginning of *August*, by which Time they will have grown so large as almost to meet each other; then prepare some more Beds of the like good Earth, (in Quantity proportionable to the Flowers you have rais'd) in which you should plant them at six Inches Distance each Way, and not above four Rows in each Bed, for the more conveniently laying such of them as may prove worthy preserving; for in these Beds they should remain to flower.

The Allies between these Beds should be two Feet wide, that you may pass between the Beds to weed and clean them. When your Flowers begin to blow, you must look over them to see if any of them profer to make good Flowers; which so soon as you discover, you should lay down all the Layers upon them: Those which are well mark'd, and blow whole without breaking their Pods, should be reserv'd to plant in Borders, to furnish you with Seed; and those which burst their Buds, and seem to have good Properties, should be planted in Pots, to try what their Flowers will be, when manag'd according to Art: And it is not till the second Year that you can pronounce what the Value of a Flower will be, which is in Proportion to the Goodness of its Properties: Which, that you may be well acquainted with what the Florists call good Properties, I shall here set them down.

1. The Stem of the Flower should be strong, and able to support the Weight of the Flower without hanging down.

2. The Petals (or Leaves) of the Flower should be long, broad, and stiff, and pretty easy to expand, or (as the Florists term 'em) should be free Flowers.

3. The Middle Pod of the Flower should not advance too high above the other Part of the Blower.

4. The Colours should be bright, and equally mark'd all over the Flower.

5. The Flower should be very full of Leaves, so as to render it, when blown, very thick and high in the Middle, and the Outside perfectly round.

Having

Having made choice of such of your Flowers as promise well for the large Sort, these you should mark separately for Pots, and the round whole blowing Flowers for Borders; you should pull up all single Flowers, or such as are ill-colour'd and not worth preserving, that your good Flowers may have the more Air and Room to grow strong; these being laid, so soon as they have taken Root, (which will be some time in *August*) they should be taken off, and planted out, those that blow large in Pots, and the other in Borders, (as hath been already directed.) But I shall now proceed to give some Directions for propagating these Flowers by *Layers*, and the necessary Care to be taken, in order to blow them fair and large.

The best Season for laying these Flowers is in *June*, as soon as the Shoots are strong enough for that Purpose, which is perform'd in the following Manner. After having stript off the Leaves from the lower-part of the Shoot intended to lay, make choice of a strong Joint about the middle part of the Shoot, (not too near the Heart of the Shoot, nor in the hard part next the old Plant) then with your Penknife make a Slit in the middle of the Shoot from the Joint upwards half way to the other Joint, or more, according to their Distance, then with your Knife cut the Tops of the Leaves, and also cut off the swelling part of the Joint where the Slit is made, (which might otherwise prevent their pushing out Roots) and having loosened the Earth round the Plant, and, if need be, rais'd it with fresh Mould, so that it may be level with the Shoot intended to lay, lest by forcing down the Shoot you split it off; then with your Finger make a hollow Place in the Earth, just where the Shoot is to come, and with your Thumb and Finger bend the Shoot gently into the Earth, observing to keep the Top as upright as possible, that the Slit may be open; and being provided with forked Sticks for that Purpose, thrust it into the Ground, so that the forked-part may take hold of the *Layer*, in order to keep it down in its proper Place; then gently cover the Shank of the *Layer* with the same sort of Earth, giving it a gentle watering, to settle the Earth about it, observing to repeat the same as often as is necessary, in order to promote their rooting. In about five or six Weeks after this the *Layers* will have taken Root sufficient to be transplanted; against which time you should be provided with proper Earth for them, which may be compos'd after the following manner.

Make choice of some good Up-land Pasture, or a Common that is of a hazel Earth, or light sandy Loam; dig from the Surface of this your Earth about eight Inches deep, taking all the Turf with it, let this be laid in a Heap to rot and mellow, turning it once a Month, that it may sweeten; then mix about a third-part of rotten Neats-dung, or, for want of that, some rotten Dung from a Cucumber or Melon-bed; let this be well mix'd together; and if you can get it time enough before-hand, let them lie mix'd six or eight

Months before it is used, turning it several times, the better to incorporate their Parts.

Observe, That altho' I have mention'd this Mixture as the best for these Flowers, yet you must not expect to blow your Flowers every Year equally large, in the same Composition: Therefore, some People who are extremely fond of having their Flowers succeed well, alter their Compositions every Year, in this manner; *viz.* one Year they mix the fresh Earth with Neats-dung, which is cold; the next Year with rotten Horse-dung, which is of a warmer Nature, adding thereto some white Sea-sand, to make the Earth lighter.

But for my part, I should rather advise the planting two or three *Layers* of each of your best Kinds in a Bed of fresh Earth not overdung'd; which Plants should only be suffer'd to shew their Flowers, to prove them right in their kind; and when you are satisfied in that Particular, cut off the Flower Stems, and don't suffer them to spend the Roots in blowing; by which means you'll greatly strengthen your *Layers*. And it is from these Beds I would make choice of some of the best Plants for the next Year's blowing, always observing to have a Succession of them yearly; by which means you may blow every Year fine, supposing the Season favourable: For it is not reasonable to suppose that the *Layers* taken from such Roots as have been exhausted in producing large Flowers, and have been forc'd by Art beyond their natural Strength, should be able to produce Flowers equally as large as their Mother-Root did the Year before, or as such *Layers* as are fresh from a poorer Soil, and in greater Health, can do. But this being premis'd, let us proceed to the potting of these *Layers*, which (as I said before) should be done in *August*.

The common Method used by most Florists, is, to plant their *Layers*, at this Season, two in each Pot, (the Size of which Pots are about nine Inches over in the Clear at the Top;) in these Pots they are to remain for Bloom; and therefore, in the Spring of the Year, they take off as much of the Earth from the Surface of the Pots as they can, without disturbing their Roots, filling the Pots up again with the same good fresh Earth as the Pots were before fill'd with. But there is some Difficulty in sheltering a great Quantity of these Flowers in Winter, when they are planted in such large Pots, which in most Winters they will require, more or less; My Method therefore is, to put them singly into Halfpenny Pots in *Autumn*, and in the Middle of *October* to set these Pots into a Bed of old Tanners Bark which has lost its Heat, and cover them with a common Frame (such as is used for raising Cucumbers and Melons); and in one of these Frames, which contains three Lights, may be set an hundred and fifty of these Pots: In these Frames you may give them as much free Air as you please, by taking off the Lights every Day when the Weather is mild, and putting them on in bad Weather, and great Rains: And if the Winter should prove severe, it is but only covering the Glasses with Mats, H h Straw,

Straw, or Pease-haulm, which will effectually preserve your Plants in the utmost Vigour.

In the Middle of *February*, if the Season is good, you must transplant these Layers into Pots for their Bloom (which should be about seven Inches over at the Top in the Clear); in the doing of which, observe to put some Pot-sherds or Oyster-shells over the Holes in the Bottoms of the Pots to keep the Earth from stopping them, which would detain the Water in the Pots to the great Prejudice of the Flowers; then fill these Pots about half way with the same good Compost as was before directed, and shake the Plants out of the small Pots with all the Earth about the Roots; then, with your Hands, take off some of the Earth round the Outside of the Ball, and from the Surface, placing one good Plant exactly in the Middle of each Pot, so that it may stand well as to Height, *i. e.* not so low as to bury the Leaves of the Plant with Earth; nor so high that the Shank may be above the Rim of the Pot; then fill the Pot up with the Earth before-mention'd, closing it gently to the Plant with your Hands, giving it a little Water, if the Weather is dry, to settle the Earth about it; then place these Pots in a Situation where they may be defended from the North Wind, observing to give them gentle Waterings, as the Season may require.

In this Place they may remain till about the Middle of *April*, at which time you should prepare a Stage of Boards to set the Pots upon, which should be so order'd, as to have little Cisterns of Water round each Pot, to prevent the Insects from getting to your Flowers in their Bloom; which, if they are suffer'd to do, will mar all your Labour, by destroying all your Flowers in a short Time: The chief and most mischievous Insect in this Case is, the Earwig, which will gnaw off all the lower Parts of the Petals of the Flowers (which are very sweet) and thereby cause the whole Flower to fall to Pieces: But since the making one of these Stages is somewhat expensive, and not very easy to be understood by such as have never seen them, I shall therefore describe a very simple one, which I have used for several Years, which answers the Purpose full as well as the best and most expensive one can do: First, prepare some common flat Pans, about a Foot over, and three Inches deep; place these two and two opposite to each other, at about two Foot Distance; and at every eight Feet in Length-ways, two of these Pans; in each of these whelm a Flower-pot, which should be about six Inches over at the Top, upside-down, and lay a flat Piece of Timber, about two Feet and a half long and three Inches thick, cross from Pot to Pot, till you have finish'd the whole Length of your Stage; then lay your Planks lengthways upon these Timbers, which will hold three Rows of Planks for the Size-pots which were order'd for the *Carnations*: And when you have set your Pots upon the Stage, fill the flat Pans with Water, always observing as it decreases in the Pans to replenish it, which will effectually guard your Flowers against Insects.

This Stage should be plac'd in a Situation open to the South-East, but defended from the West Winds, but should not be too near Trees, Walls, nor Buildings. About this Time, *viz.* the Middle of *April*, your Layers will begin to shoot up for Flower; you must therefore be provided with some square Deal Sticks about four Feet and a half long, which should be thicker toward the Bottom, and plain'd off taper at the Top: These Sticks should be carefully stuck into the Pots as near as possible to the Plant without injuring it; then with a slender piece of Bass-mat fasten the Spindle to the Stick to prevent its being broke: This you must often repeat as the Spindle advances in Height; and also observe to pull off all side Spindles as they are produc'd, and never let more than two Spindles remain upon one Root, nor above one, if you intend to blow exceeding large. Toward the Beginning of *June* your Flowers will have attain'd their greatest Height, and their Pods will begin to swell, and some of the earliest begin to open on one Side; you must therefore observe to let it open in two other Places at equal Angles: This must be done so soon as you perceive the Pod break, otherwise your Flower will run out on one Side, and be past recovering, so as to make a complete Flower in a short time; and in a few Days after the Flowers begin to open, you must cover them with Glasses which are made for that Purpose, in the following manner:

Upon the Top of the Glass, exactly in the Center, is a Tin Collar or Socket about three fourths of an Inch square, this is for the Flower-stick to come through; to this Socket is soldered eight Slips of Lead at equal Distances, which are about six Inches and a half long, and spread open at the Bottom about four Inches asunder; into these Slips of Lead are fasten'd Slips of Glass, cut according to the Distances of the Lead, which when they are fix'd in, are border'd round the Bottom with another Slip of Lead quite round, so that the Glass hath eight Angles with the Socket in the Middle, and spread open at the Bottom about eleven Inches.

When your Flowers are open enough to cover with these Glasses, you must make a Hole through your Flower-stick exactly to the Height of the under Part of the Pod, through which you should put a Piece of small Wire about six Inches long, making a Ring at one End of the Wire to contain the Pod, into which Ring you should fix the Stem of the Flower; then cut off all the Tyings of Bass, and thrust the Stem of the Flower so far from the Stick, as may give convenient Room for the Flower to expand without pressing against the Stick; to which Distance you may fix it by turning your Wire so as not to draw back thro' the Hole; then make another Hole thro' the Stick, at a convenient Distance above the Flower, through which you should put a Piece of Wire, an Inch and a half long, which is to support the Glasses from sliding down upon the Flowers, and be sure to observe that the Glasses are not plac'd so high as

to admit the Sun and Rain under them to the Flowers, nor so low as to scorch their Leaves with the Heat. At this time also, or a few Days after, as you shall judge necessary, you should cut some stiff Paper, Cards, or some such Thing, into Collars about four Inches over, and exactly round, cutting a Hole in the Middle of it about Three Fourths of an Inch Diameter for the Bottom of the Flower to be let through; then place these Collars about them to support the Petals of the Flower from hanging down: This Collar should be plac'd withinside the Calyx of the Flower, and should be supported thereby: Then observe from Day to Day what Progress your Flowers make; and if one Side comes out faster than the other, you should turn the Pot about, and shift the other Side towards the Sun; and also if the Weather proves very hot, you should shade the Glasses in the Heat of the Day with Cabbage-leaves, &c. to prevent their being scorch'd, or forc'd out too soon; and when the middle Pod begins to rise, you should take out the Calyx thereof with a Pair of Nippers made for that Purpose; but this should not be done too soon, lest the middle part of the Flower should advance too high above the Sides, which will greatly diminish the Beauty of it: And you should also observe whether there are more Leaves in the Flower than can properly be expanded for Want of Room; in which Case you should pull out some of the lowermost or most unlikely Leaves to spread, drawing out and expanding the others at the same time: And when your Flowers are fully blown, if you cut them off, you should put on a fresh Collar of stiff Paper, which should be cut exactly to the Size of the Flower, so that it may support the Petals to their full Width, but not to be seen wider than the Flower in any Part: When this is put on, you must draw out the widest Leaves to form the Outside of the Flower, which altho' they should be in the Middle (as it often happens) yet by removing the other Leaves they may be drawn down, and so the next longest Leaves upon them again, that the whole Flower may appear equally globular without any hollow Parts. In the doing of this, some Florists are so curious as to render an indifferent Flower very handsome; and on this depends, in a great measure, the Skill of the Artist to produce large fine Flowers.

During the flowering Season, particular Care should be taken not to let them suffer for want of Water, which should by no means be raw Spring-water; nor do I approve of Compound-waters, such as are enrich'd with various Sorts of Dungs, but the best and most natural Water is that of a fine soft River; next to that is Pond-water or Standing-water; but if you have no other but Spring-water, it should be expos'd to the Sun or Air two Days before it is used, otherwise it will give the Flowers the Canker and spoil them. Thus having been full in the Culture of this noble Flower, I shall just mention that of the *Pink*, which differs not in the least from that of the *Carnation* in its manner of propagating, but only requires

much less Care, and need not be potted, growing full as well in good Borders, where they make as elegant a Shew, during their Season of Flowering, as any Plant whatever, and afford as agreeable a Scent. The Varieties of these are,

The *Damask Pink*, *White Shock*, *Scarlet*, *Pheasant's-ey'd Pink*, of which there are great Varieties, both with single and double Flowers, *Old Man's Head*, *Painted Lady*, with several others. These may be propagated by *Layers* as the *Carnations*, and many of them by Cuttings planted in *July*, or from Seeds, by which Method new Varieties may be obtain'd. The manner of sowing these Seeds being the same with the *Carnations*; I shall refer back to that, to avoid Repetition, and shall proceed to the *China Pink*, which is a Flower of later Date amongst us than any of the former, which altho' it hath no Scent, yet for the great Diversity of beautiful Colours which are in these Flowers, with their long Continuance in flower, do merit a Place in every good Garden.

1. *CARYOPHYLLUS*; *Sinensis*, *supinus*, *leucoid folio*, *flore vario*. *Tourn.* The variable *China* or *Indian Pink*.

2. *CARYOPHYLLUS*; *Sinensis*, *supinus*, *leucoid folio*, *flore pleno*. *Boerb. Ind.* The double *China Pink*.

There are a great Variety of different Colours in these Flowers, which vary annually as they are produc'd from Seeds, so that in a large Bed of these Flowers, scarcely two of them are exactly alike, and their Colours in some are exceeding rich and beautiful; we should therefore be careful to save the Seeds from such Flowers only that are beautiful, for they are very subject to degenerate from Seeds.

And the Seeds of the double Sort will produce many double Flowers again; but the Seeds of the single will scarcely ever produce a double Flower.

These Flowers are only propagated by Seeds, which should be sown toward the End of *March*, in a Pot or Box of good light Earth, and set under a Glass to forward its vegetating; giving it Water as often as you shall see necessary, and in about a Month's time your Plants will come up, and be of some Bigness; you must therefore expose them to the open Air, and in a short Time after prepare some Beds of good fresh Earth, (not too stiff) in which you may prick out these Plants, about three Inches square, observing to water and shade them, as the Season may require.

In those Beds they may remain until the Middle of *June*, at which time you may remove and plant them in the Borders of the Pleasure-Garden, being careful to preserve as much Earth to their Roots as possible; and in a Month's time after they will begin to flower, and continue until the Frost prevent them. About the Middle or Latter-end of *August* their Seeds will begin to ripen, at which time you should look over them once a Week, gathering off the Pods that are changed brown, and spread them on Papers to dry, when you may rub out the Seed, and put it up for Use. Tho'

Tho' these Plants are usually term'd Annuals, and sown every Year; yet their Roots will abide two or three Years, if suffer'd to remain, and will endure the greatest Cold of our Winters, if planted in a dry Soil, and without any Shelter, as I experienc'd the last Winter, Anno 1728, at which Time I had a large Bed of these Flowers, which was rais'd a Foot above the Level of the Ground; and altho' its Situation was such that the Sun never shone upon it from October to March, yet I had not one Root destroyed in the whole Bed, altho' it stood open, and without any Care taken of it.

I shall now come to the *Sweet-Williams*, where I shall first give the Names of a few of them, and proceed to their Culture.

1. *CARYOPHYLLUS*; *barbatus, bortenensis, latifolius*. C. B. The broad-leav'd Sweet William with Red Flowers.

2. *CARYOPHYLLUS*; *barbatus, bortenensis, latifolius, flore variegato*. Boerb. Ind. The broad-leav'd Sweet William with variegated Flowers.

3. *CARYOPHYLLUS*; *barbatus, flore multiplici*. C. B. The Double Sweet-William with Red Flowers, which burst their Pods.

4. *CARYOPHYLLUS*; *barbatus, flore multiplici roseo*. C. B. The Rose-coloured Double Sweet-William.

5. *CARYOPHYLLUS*; *barbatus, bortenensis, angustifolius*. C. B. The Narrow-leav'd Garden Sweet-William, formerly call'd Sweet-Johns.

6. *CARYOPHYLLUS*; *barbatus, bortenensis, angustifolius, flore versicolore in eodem ramulo*. C. B. The Sweet-John, with various-colour'd Flowers on the same Branch.

7. *CARYOPHYLLUS*; *barbatus, bortenensis, angustifolius, flore pleno roseo*. The Double Rose-colour'd Sweet-John, or Fairchild's Mule.

The single Kinds of these Flowers are generally propagated by Seeds, which must be sown in March in a Bed of light Earth; and in May they will be fit to transplant out; at which time you must prepare some Beds ready for them, and set them at six Inches Distance every way: In these Beds they may remain 'till Michaelmas, at which time they may be transplanted into the Borders of the Pleasure-Garden or Wilderness: These will flower the next Year in May, and will perfect their Seeds in July or August, which you should save from the best-colour'd Flowers for a Supply.

They may be also propagated by slipping their Roots at Michaelmas: But this is seldom practis'd; since their Seedling Roots will always blow the strongest, and new Varieties are obtain'd yearly.

The Double Kinds are propagated by Layers, as the *Carnations*; they love a middling Soil, not too light, nor too heavy or stiff; nor too much dung'd, which very often occasions their rotting: these continue flowering for a long time, and are extremely beautiful, especially the *Mule*, which produces two full Blooms of Flowers, one in May, and the other in July: This is very subject to canker and rot away, especially if planted in a Soil

over-wet, or too dry, or if watered with sharp Spring-Water: These Flowers being planted in Pots, are very proper to adorn Court-Yards, at the time they are in flower.

CASSIA.

The Characters are;

It hath a cylindrical, long, taper, or flat Pod, which is divided into many Cells by transverse Diaphragms, in each of which is contain'd one hard Seed, which is for the most part lodg'd in a clammy black Substance which is purgative: The Flowers consist of five Leaves, which are dispos'd in an orbicular Order.

The Species are;

1. *CASSIA*; *Americana, foliis subrotundis acuminatis*. Tourn. The American Cassia with roundish-pointed Leaves.

2. *CASSIA*; *Americana fætida, foliis oblongis glabris*. Tourn. The Stinking American Cassia with oblong smooth Leaves.

3. *CASSIA*; *Sylvestris, fætida, filiquis alatis*. Plum. Nov. Gen. The wild stinking Cassia with wing'd Pods, call'd in the West-Indies French Guava.

4. *CASSIA*; *Marylandica, pinnis foliorum obtusis, radice repente*. Cassia from Maryland, with blunt Leaves, and a creeping Root.

5. *CASSIA*; *Babamensis, pinnis foliorum mucronatis, angustis calyce floris non reflexo*. Mart. Hist. Pl. Dec. 2. Narrow-leav'd Cassia of the Babama Islands, with a reflex'd Cup to the Flower.

6. *CASSIA*; *Barbadosensis, pinnis foliorum mucronatis calyce floris non reflexo*. Ibid. Barbadoes Cassia, with a reflex'd Cup, and pointed Leaves.

7. *CASSIA*; *Americana fætida, foliis obtusis*. Tourn. Stinking American Cassia with blunt Leaves.

8. *CASSIA*; *Americana, filiquis planis*. Plum. Nov. Gen. American Cassia with smooth Pods.

9. *CASSIA*; *fistula Alexandrina*. C. B. The Purging Cassia, or Pudding-Pipe-Tree.

These Cassia's are all propagated by Seeds, which must be sown in a Hot-Bed in February, and afterwards transplanted into Pots, which must be plung'd into another Hot-bed, and must be kept forward, by removing them from one Hot-bed to another (as was directed for the *Amaranthus*.) Nor should these Plants be ever expos'd to the open Air, if we intend to see them flower; they must therefore be kept in a warm Stove in Winter, and be carefully manag'd: Many of these Plants will flower the second Year, and some of them produce ripe Seeds with us; nay, sometimes, many of them will flower the first Year, if they were sown very early, as the fifth, sixth, seventh, and eight Sorts frequently do; but then they are more apt to decay in Winter, than those that do not flower: The fourth Sort will endure the severest Cold of the Winter in the open Ground, and increases plentifully by the Root: this produces Flowers in the Autumn; but our Summers are not warm enough to ripen their Seeds. The ninth Sort grows to be a very large Tree, not only in

in *Alexandria*, but also in the *West-Indies*: This is what produces the purging *Cassia* of the Shops, and may be rais'd by sowing (fresh Seeds taken out of the Pulp) in a Hot-bed in the Spring of the Year, and must be manag'd as the other Sorts: This will grow with us to be a handsome Shrub, but must be kept in a warm Stove, otherwise it will not endure through the Winter. All these *Cassia*'s love a light sandy Soil, and in warm Weather must be frequently water'd. The third Sort will grow to a great Height in one Season, if it be forwarded in Hot-beds; but is with much Difficulty preserv'd the Winter through: This has flower'd in *England*, but I have not heard of its producing any Seeds.

CASSIDA, [i. e. an *Helmet*,] Skull-cap.

The Characters are;

The Florets are longish, one in each Ala of the Leaves: The Upper-Leaf is galeated (like an *Helmet*) with two Auricles adjoining: The Under-Leaf, for the most part, is divided into two: The Calix having a Cover, contains a Fruit resembling the Heel of a Slipper or Shoe; which Character, singly, might be sufficient to distinguish it.

The Species are;

1. CASSIDA; folio melisse, flore purpureo longiore. Boerb. Ind. Skull-cap, with Leaves like Baum, and long purple Flowers.
2. CASSIDA; Cretica, fruticosa, folio cataria, flore albo. T. Cor. Shrubby Skull-cap from Crete, with Leaves like Cat-mint, and white Flowers.
3. CASSIDA; Orientalis, altissima, urticae folio, T. Cor. The tallest Eastern Skull-cap, with Leaves like Nettle.
4. CASSIDA; Orientalis, folio chamædrys flore luteo. T. Cor. Eastern Skull-cap with Germander Leaves, and yellow Flowers.

There are several other Varieties of this Plant, which are preserv'd in curious Gardens of Plants; but these here mention'd are the most beautiful of them, and best worth preserving in curious Gardens, for their Variety.

They may be all propagated by sowing their Seeds in an open Bed of light Earth in *March*; and when they come up, may be transplanted either into Pots, for the Convenience of sheltering them in Winter, or into Borders under warm South Walls, where, if the Soil is dry, they will endure our common Winters abroad very well, but in hard Winters they are liable to be destroy'd.

The fourth Sort is the hardiest of them all, as also the most beautiful; but this seldom produces good Seed in our Country: however, it is very easy to increase this Plant by Cuttings; or from young Plants, which may be obtain'd from the Branches of the old ones which lie near the Ground, and strike out their Roots from the Joynts.

The other three Sorts ripen their Seeds tolerably well with Us, from which young Plants may be annually obtain'd, and also by parting their Roots; these generally die down to the Surface after Seeding, and fresh Shoots

arise from the Roots at the same time, so that the Plants are never destitute of green Shoots.

CASSINE: The *Cassiberry-Bush* and *South-Sea Thea*.

1. CASSINE; vera perquam similis arbuscula, Phyllyrea foliis antagonistis, ex provincia Carolinaensi. Pluk. Mant. The *Cassiberry-Bush*.

2. CASSINE; vera Floridanorum, arbuscula baccifera alaterni formæ facie, foliis alternatim sitis, tetrapylene. Pluk. Mant. The *South-Sea Thea-Tree*; vulgô.

The first of these Trees is hardy, and will endure our severest Winters in the open Ground, after they are become woody; therefore it will be proper to shelter the young Plants two or three Winters while they are young; after which time they may be transplanted abroad in some well shelter'd situation, upon a light Soil, where they will thrive exceedingly, and in a few Years produce Flowers. This Tree seldom grows to be very large, and therefore should be planted among Trees of a middling Growth. The largest of these Trees which I have as yet seen in *England* is now growing in the Gardens of that curious and learned Botanist Charles DuBoise Esq; at *Mitcham* in *Surrey*, which is about ten Feet high, and pretty thick in the Stem; this Tree hath stood abroad in an open Situation for several Years, resisting the severest Winters, and hath flower'd many Years; but I don't remember to have heard of its producing any Fruit.

The second Sort is much tenderer than the former, and should not be planted in the full Ground until the Plants have acquir'd a considerable Strength; nor should they be planted in a Situation too much expos'd to the cold Winds, and must have a dry sandy Soil: This Sort differs from the former, in the Manner of producing its Leaves, which are placed alternately on the Branches, whereas the other produces its Leaves by Pairs opposite to each other. This is an Ever-green, but the *Cassiberry-Bush* sheds its Leaves in Winter.

These Trees are both of them propagated by sowing their Seeds, (which are obtain'd from *Carolina*, where they grow in great Plenty near the Sea-coast;) they should be sown in Pots fill'd with light sandy Earth, and plung'd upon a gentle Hot-bed, observing to water it frequently, until you see the Seeds appear, which is sometimes in a Month or five Weeks time, and at other times remain in the Ground until the second Year; therefore if the Seeds should not come up in two Months time, you should remove the Pots into a shady Situation, where they may remain 'till *October*, being careful to keep them clean from Weeds, and now and then in dry Weather giving them a little Water: Then remove these Pots into Shelter during the Winter-season, and in the *March* following put them upon a fresh Hot-bed, which will forward their Seeds in their Vegetation.

When the Plants are come up, they should by degrees be expos'd to the open Air, in order to inure them to our Climate; yet don't expose

expose them to the open Sun at first, but rather let them have the Morning Sun only, placing them for some time where they may be shelter'd from cold Winds: They should enjoy a Shelter during the two or three first Winters; after which, the *Cassioberry-Bush* may be planted abroad: But the *South-Sea Thea* should be kept in Pots a Year or two longer, being slower of Growth, and will therefore not have Strength enough to resist the Cold when young.

They may also be propagated by laying the younger Branches into the Ground in the Spring, which, if kept water'd, will take Root by the succeeding Spring, fit for Transplantation; otherwise they'll be two Years before they take Root. The *Cassioberry-Bush* is by much the easiest Plant of the two to strike.

The *Paraguay* or *South-Sea Thea* is accounted by the *Indians* very wholesome, and (as I have been inform'd by several worthy Persons who resided for several Years in *Carolina*) is the only Physick the *Indians* use, and for which, at certain Times of the Year, they come in Drove some hundred Miles distant, for the Leaves of this Tree, (it not being known to grow at any considerable Distance from the Sea): Where their usual Custom is, to make a Fire upon the Ground, and putting a great Kettle of Water thereon, they throw into it a large Quantity of these Leaves, and immediately set themselves round the Fire, and with a Bowl that holds about a Pint, they begin drinking round large Draughts, which in a very short Time vomits them severely; thus they continue Drinking and vomiting for the space of two or three Days, until they have sufficiently cleans'd themselves; then they gather every one a Bundle of the Tree to carry away with them, and retire to their Habitations. But these Gentlemen observ'd something very extraordinary in the Operation of this Plant, which was, that in Vomiting, it gave them no Uneasiness or Pain, but came away in a full Stream from their Mouths, without so much as declining their Heads, or the least Reaching.

Monsieur *Frezier* also says, That the *Spaniards* who live near the Gold-Mines in *Peru*, are obliged frequently to drink of the Herb *Paraguay* or *Mate*, to moisten their Breasts, without which, they are liable to a sort of Suffocation, from the strong Exhalations which are continually coming from the Mines.

The same Author also adds, That the Inhabitants of *Lima*, during the Day-time, make much Use of the Herb *Paraguay*, which some call *St. Bartholomew's Herb*, who, they pretend, came into those Provinces, where he made it wholesome and beneficial, whereas before it was venomous: This (he says) is brought to *Lima* dry, and almost in Powder.

Instead of drinking the Tincture or Infusion apart, as we drink *Tea*, they put the Herb into a Cup or Bowl made of a *Calabash*, tipp'd with Silver, which they call *Mate*; they add Sugar, and pour the hot Water upon it, which they drink immediately, without giving it Time

to infuse, because it turns as black as Ink: To avoid drinking the Herb which swims at the Top, they make Use of a Silver-pipe, at the End whereof is a Bowl full of little Holes; so that the Liquor suck'd in at the other End is clear from the Herb. They drink round with the same Pipe, pouring hot Water on the same Herb, as it is drank off. Instead of a Pipe, which they call *Bombilla*, some part the Herb with a Silver Separator, call'd *Apartador*, full of little Holes. The Reluctancy which the *French* have shewn to drink after all sorts of People, in a Country where many are Pox'd, has occasion'd the inventing the Use of little Glass-pipes, which they begin to use at *Lima*. This Liquor (he says) in his Opinion, is better than *Tea*; it has a Flavour of the Herb, which is agreeable enough; the People of the Country are so us'd to it, that even the poorest drink it once a Day, when they rise in the Morning.

The Trade for this Herb (he says) is carry'd on at *Santa Fé*, whither it is brought up the River of *Plate*. There are two Sorts of it; the one call'd *Yerba de Palos*; and the other, which is finer, and of more Virtue, *Yerba de Camini*: The last is brought from the Lands belonging to the *Jesuits*; the great Consumption of it is between *La Paz* and *Cuzco*, where it is worth half as much more as the other, which is sent from *Potosi* to *La Paz*. There come yearly from *Paraguay* into *Peru* above fifty thousand *Arrova's*, twelve thousand Hundred Weight of both Sorts, whereof at least one third is of the *Camini*, without reckoning twenty-five thousand *Arrova's* of that of *Palos* for *Cbili*. They pay for each Parcel, containing six or seven *Arrova's*, four Royals for the Duty call'd *Alcavala*, (being a Rate upon all Goods sold) which, with the Charge of Carriage, being above six hundred Leagues, doubles the first Price, which is about two Pieces of Eight; so that at *Potosi* it comes to about five Pieces of Eight the *Arrova*. The Carriage is commonly by Carts, which carry an hundred and fifty *Arrova's* from *Santa Fé* to *Jujuy*, the last Town of the Province of *Tucuman*; and from thence to *Potosi*, which is an hundred Leagues farther, it is carry'd on Mules.

What this curious Author has observ'd, on there being two Sorts of this Herb, may very well agree with those two Sorts here mention'd, since both of them are generally suppos'd to agree in their Qualities, tho' one is much preferable to the other; therefore I imagine the *Yerba de Camini* is what we call *Paraguay*, or *South-Sea Thea*; and the *Yerba de Palos*, to be our *Cassioberry Bush*, the Leaves of which are extreme bitter, especially when taken green from the Tree, and the Taste is hardly to be gotten out of the Mouth for some Hours after chewing a Leaf thereof. But as our Author only saw the dry'd Herb, he could no more distinguish their Difference, than we can the *Thea* brought from *China*; I mean, as to the particular Trees which produce it.

CASTA-

CASTANEA, [takes its Name from *Castaneum*, a City of *Magnesia*, where this Tree anciently grew in great Plenty.] The Chestnut-Tree.

The Characters are ;

It bath Male Flowers (or Katkins) which are placed at remote Distances from the Fruit on the same Tree: The outer Coat of the Fruit is very rough, and has two or three Nuts included in each Husk or Covering.

The Species are ;

1. **CASTANEA** ; *fativa*. C. B. The common or manured Chestnut.

2. **CASTANEA** ; *fativa, foliis eleganter variegatis*. The strip'd Chestnut.

3. **CASTANEA** ; *pumilis, Virginiana, racemosa fructu parvo, in singulis capsulis echinato unico*. Banist. Pluk. Alm. The Chinquapin or Dwarf Virginian Chestnut.

The first of these Trees was formerly in greater Plenty amongst us than at present, as may be prov'd by the old Buildings in *London*, which were for the most part of this Timber ; and in a Description of *London*, written by *Fitz-Stephens*, in *Henry the II's* Time, he speaks of a very noble Forest which grew on the North Part of it: *Proxime* (says he) *patet foresta ingens, saltus nemorosi ferarum, latebra cervorum, damarum, aprorum & taurorum sylvestrium, &c.* And there are some Remains of old decay'd Chestnuts in the old Woods and Chases not far distant from *London*, which plainly proves, that this Tree is not so great a Stranger to our Climate as many People believe it to be, and may be cultivated in *England*, to afford an equal Profit with any of the larger Timber-trees, since the Wood of this Tree is equal in Value to the best *Oak*, and, for many Purposes, far exceeding it ; as particularly for making Vessels for all Kinds of Liquors, it having a Property (when once thoroughly season'd) of maintaining its Bulk constantly, and is not subject to shrink or swell as other Timber is too apt to do ; and I am certainly inform'd, that all the large Casks, Tuns, &c. for their Wines in *Italy*, are made of this Timber ; and it is for that, and many more Purposes, in greater Esteem amongst the *Italians* than any other Timber whatever. It is also very valuable for Pipes to convey Water under-ground, as enduring longer than the *Elm* or any other Wood : In *Italy* it is planted for Coppice-Wood, and is very much cultivated in Stools, to make Stakes for their Vines ; which being stuck into the Ground with the Rind on, will endure seven Years, which is longer than any other Stakes will do by near half the Time. The Usefulness of the Timber, together with the Beauty of the Tree, renders it as well worth propagating as any Tree whatever, especially in Avenues or smaller Plantations near a Dwelling-house.

These Trees are propagated by planting the Nuts in *February* in Beds of fresh undung'd Earth : The best Nuts for sowing, are such as are brought from *Portugal* and *Spain*, and are commonly sold in Winter for Eating : These should be preserv'd until the Season for sowing in Sand, where Mice or other Vermin

can't come to them, otherwise they will soon destroy them : Before you set them, it will be proper to put them into Water, to try their Goodness, which is known by their Ponderosity ; those of them that swim upon the Surface of the Water, should be rejected as good for nothing ; but such as sink to the Bottom you may be sure are good.

In setting these Seeds, or Nuts, the best Way is, to make a Rill with a Hoe (as is commonly practis'd in setting *Kidney-Beans*) about four Inches deep, in which you should place the Nuts at about four Inches Distance, with their Eye uppermost ; then draw the Earth over them with a Rake, and make a second Rill at about six Inches Distance from the former, proceeding as before, allowing six Rows in a Bed, with an Alley between two Feet broad, for a Convenience of clearing the Beds, &c. When you have finish'd your Plantation, you must be careful that it is not destroy'd by Mice, or other Vermin, which is very often the Case, if they are not prevented by Traps or other Means.

In *April* these Nuts will appear above ground ; you must therefore observe to keep them clear from Weeds, especially while young : In these Beds they may remain for two Years, when you should remove them into a Nursery, at a wider Distance : The best Season for transplanting these Trees, is either in *October*, or the latter End of *February* : The Distance these should have in the Nursery, is three Feet, Row from Row, and one Foot in the Rows : You must be careful, in transplanting these Trees, to take them up without injuring their Roots, nor should they remain long out of the Ground ; but if these Trees have a downright Tap-Root, it should be cut off, especially if it be intended to remove them again : This will occasion their putting out lateral Roots, and render them less subject to miscarry when they are remov'd for good.

The Time generally allow'd them in this Nursery is three or four Years, according to their Growth ; during which, you should be careful to keep them clear from Weeds, observing also to prune off lateral Branches, which would retard their upright Growth ; and where you find any that are dispos'd to grow low, either by their upper Bud being hurt, or from any other Accident, you may, the Year after planting (in *March*) cut them down to the lowermost Eye next the Surface of the Ground, which will cause them to make one strong upright Shoot, and may be afterwards train'd into good straight Trees.

But in doing of this, you must be careful not to disturb their Roots, which, perhaps, might destroy them. These Trees require no other Manure than their own Leaves, which should be suffer'd to rot upon the Ground ; and in the Spring of the Year, the Ground should have a slight digging, when this should be bury'd between their Roots, but not too close to the Trees, which might be injurious to their young Fibres.

After having remain'd three or four Years in the Nursery, they will be fit for transplanting, either

either in Rows for Avenues to a House, or in Quarters for Wilderness Plantations; but if you intend them for Timber, it is by much the better Method to sow them in Furrows, (as is practis'd for Oaks, &c.) and let them remain unremov'd; for these Trees are apt to have a downright Tap-Root, which being hurt by transplanting, is often a Check to their upright Growth, and causes them to shoot out into lateral Branches, as is the Case with the Oak, Walnut, &c.

Therefore where-ever any of these Trees are planted for Timber, they should remain unremov'd; but where the Fruit of them is more sought after, then it is certainly the better Way to transplant them; for as transplanting is a Check to the luxuriant Growth of Trees, so is it a Promoter of their Fructification, as may be evinc'd by observing low shrubby Oaks, Walnuts, &c. which generally have a greater Plenty of Fruit than any of the larger and more vigorous Trees; and the Fruit of such Trees are much superior in Taste, tho' the Seeds of vigorous Trees are vastly preferable for Plantations of Timber; for the weaker Trees being less capable to furnish a Supply of Nourishment, and having a greater Quantity of Fruit upon them to which this must be distributed, together with their Roots lying near the Surface of the Ground, (by which Means the Juices are better prepar'd by Sun, Air, &c. before it enters their Vessels) 'tis certain their Juices are better digested, and their Fruits better maturated than those can possibly be which grow upon strong vigorous Trees, which have long Tap-Roots running several Feet deep into the Earth, and so consequently take in vast Quantities of crude unprepar'd Juice, which is buoy'd up to the extreme Parts of the Tree, and these seldom having many lateral Branches to digest and prepare their Juice by perspiring or throwing off the crude Part before it enters the Fruits.

And this, I dare say, universally holds good in all Sorts of Fruit-trees, and is often the Occasion of the good and bad Qualities of the same Sorts of Fruits growing on the same Soil.

What has been related about grafting this Tree into the Walnut, to promote their bearing, or render their Fruit fairer; or inoculating Cherries into the Chestnut, for later Fruit, is very whimsical and silly, since neither the Chestnut nor Walnut will receive its own Kind any other Way than by inoculating, or inarching; and it is the latter only which the Walnut can be propagated by; nor was it ever known that any two Trees of a different Genus would take upon each other so as to produce a good Tree, therefore we may justly explode all those different Graftings of various Trees upon each other, so much talk'd of by the Antients; at least, we may suppose those Trees are not known by the same Names now that they are mention'd by in their Writings, for I have made many Trials upon them, which although perform'd with great Care, and in different Seasons, yet scarcely one of them succeeded. But to return:

If you design a large Plantation of these Trees for Timber, after having twice plough'd the Ground, the better to destroy the Roots of Weeds, you should make your Furrows about six Feet Distance from each other, in which you should lay the Nuts about ten Inches apart, covering them with Earth about three Inches thick; and when they come up, you must carefully clear them from Weeds: When these have remain'd three or four Years, (if the Nuts succeeded well) you will have many of these Trees to remove; which should be done at the Seasons before directed, leaving the Trees about three Feet Distance in the Rows; at which Distance they may remain for two or three Years more, when you should remove every other Tree, to make Room for the remaining, which will reduce the whole Plantation to six Feet square; then cut down every other of these Trees (making Choice of the least promising) within a Foot of the Ground, in order to make Stools for Poles, which in seven Years time will be strong enough to lop for Hoops, Hop-poles, &c. for which Purposes they are preferable to most other Trees; so that every seventh Year here will be a fresh Crop, which will pay the Rent of the Ground, and all other incumbent Charges, and at the same time a full Crop of growing Timber left upon the Ground: But as the large Trees increase in Bulk, so their Distance of twelve Feet square will be too small; therefore when they have grown to a Size for small Boards, you should fell every other Tree, which will reduce them to twenty-four Feet square, which is a proper Distance for them to remain for good: This will give Air to the Under-wood, (which by this time would be too much overhung by the Closeness of the large Trees) by which Means that will be greatly encourag'd, and the small Timber fell'd will pay sufficient Interest for the Money at first laid out in planting, &c. with the Principal also; so that all the remaining Trees are clear Profit, for the Under-wood still continuing will pay the Rent of the Ground, and all other Expences; and what a fine Estate here will be for a succeeding Generation, in about fourscore Years, I leave every one to judge.

The strip'd-leav'd Chestnut is a beautiful Tree in a Garden, to intermix with various Sorts of Trees, in Clumps, or in Wilderness Quarters; where, by the Variety these fine strip'd Trees afford, they greatly add to the Diversity and Pleasure of such Plantations. This may be obtain'd by being budded upon the common Chestnut.

The Chinquapin or Dwarf Virginian Chestnut, is, at present, very rare in England; it is very common in the Woods of America, where it seldom grows above twelve or fourteen Feet high, and produces great Plenty of Nuts, which are for the most part single in each outer Coat. This Tree is very hardy, and will resist the severest of our Winters in the open Ground. The Nuts of these Trees, if brought from America, should be put up in Sand so soon as they are ripe, and sent to England immediately, otherwise they lose their growing Quality, which

which is the Reason this Tree is at present so scarce with us, for not one Seed in five hundred sent over ever grew, which was owing to the Neglect of putting them up in this Manner. This Tree will take by inarching upon the common Sort, by which it may not only be propagated, but, I believe, also increas'd in Magnitude.

CASTANEA EQUINA; *vide* Hippocastanum.

CATANANCE; [*κατάρα*, a violent Allurement to Love; of *κατά* and *αρά*, Necessity; or of *καταναγκάζω*, to compel; so call'd, because of an Opinion the Antients had of it, that it was a strong and almost invincible Inducement to Amour.] Candy Lion's Foot.

The Characters are;

The Cup of the Flower is squamose; the Florets which are round the Margin are much longer than those in the Middle of the Flower; the Seeds are wrapt up in a leafy or downy Substance within the Cup or outer Covering.

The Species are;

1. **CATANANCE**; *quorundam*. *Lugd.* True Lion's-Foot, with Buck's-horn Leaves.
2. **CATANANCE**; *flore luteo, latiore folio*. *Tourn.* Broad-leav'd Candy Lion's-Foot, with a yellow Flower.
3. **CATANANCE**; *flore luteo, angustiore folio*. *Tourn.* Narrow-leav'd Candy Lion's-Foot, with a yellow Flower.

The first of these Plants is a Perennial, and may be propagated by Heads taken off from the Mother Plant, either in *Spring* or *Autumn*, which are commonly planted in Pots fill'd with light sandy Soil, in order to shelter them in the Winter from severe Frosts; but if they are planted in warm Borders, either under Walls, Pales, or Hedges, and in a moderately dry Soil, they will endure abroad very well. This Plant begins flowering in *May*, and continues till *August* or *September*, (especially if the Summer is not too dry) and is a pretty Ornament to a Garden, and is easily kept within Bounds: It may also be propagated by Seeds, which should be sown in a Border of good light Earth in *March*: And in *May*, when the Plants are come up, they may be either transplanted into Pots or Borders, where they are to remain for flowering; but as these Seeds seldom ripen well in this Country, so the former Method is what is chiefly used in *England*.

The other two Sorts are Annuals, and therefore only propagated by Seeds, which ripen very well in this Country: The Time for sowing them is early in *March*, in Beds or Borders of light Earth, which will come up in a Month's Time, and may then be transplanted into Borders to flower: These flower in *June*, and perfect their Seeds in *August* or *September*.

CATAPUTIA MAJOR; *vide* Ricinus.

CATAPUTIA MINOR; *vide* Tithymalus.

CATARIA; [so call'd of *Catus*, Lat. *Cat*; because Cats do not suffer this Plant to grow; they are very fond of it, frisk upon it, roll themselves in it, and eat it, treating it thus out of love till it dies, as Apes who kill their Young by fondling them: Cats eating too much of this Plant grow drunk, which they do, especially when they go a Catter-wauling. It is also call'd *Nepeta*, of *Nepa* *Scorpio*, because it is very good against the Bitings of Scorpions.] Cat-Mint, or *Nepeta*.

The Characters are;

The Leaves are like those of the Nettle, or Betony, are for the most part hoary, and of a strong Scent: The Flowers are collected into a thick Spike: The Crest of the Flower is broad and bifid: The Lip is divided into three Segments; the middle Segment is broad, and hollow'd like a Spoon, and elegantly crenated on the Edges; each Flower is succeeded by four naked Seeds.

The Species are;

1. **CATARIA**; *major, vulgaris*. *Tourn.* Common large Cat-Mint.
2. **CATARIA**; *quæ nepeta, minor, folio mellisse Turcicæ*. *H. Catb.* Lesser Cat-Mint, with Leaves like Turkey-Balm.
3. **CATARIA**; *angustifolia, major*. *Tourn.* Narrow-leav'd large Cat-Mint.
4. **CATARIA**; *Hispanica, betonica folio angustiori, flore cæruleo*. *Tourn.* Narrow-leav'd Spanish Cat-Mint, with blue Flowers.
5. **CATARIA**; *Hispanica, betonica folio angustiori, flore albo*. *Tourn.* Narrow-leav'd Spanish Cat-Mint, with white Flowers.
6. **CATARIA**; *Lusitanica, erecta, betonica folio, tuberosâ radice*. *Tourn.* Upright Portugal Cat-Mint, with a tuberos Root.
7. **CATARIA**; *Lusitanica, erecta, betonica folio, fibrosâ radice*. *Tourn.* Upright Portugal Cat-Mint, with fibrose Roots.
8. **CATARIA**; *minor, vulgaris*. *Tourn.* Common small Cat-Mint.

All these Sorts of Cat-mint are propagated by sowing their Seeds in *February* or *March*, in Beds or Borders of common Earth, and may be afterward transplanted into Beds at about a Foot square from each other, leaving a Path between every Bed (which should be three Feet broad) an Alley of two Feet, to go between to clear them from Weeds, &c.

The first Sort mention'd is us'd in Medicine: This may also be propagated by parting the Roots, either in *Spring* or *Autumn*, and will grow in almost any Soil or Situation: It flowers in *June*, and the Seeds are ripe in *August*. This Plant grows wild upon dry Banks in many Parts of *England*. As to what has been related of its being destroy'd by Cats, if planted in a Garden, I could never observe to be true: for I have planted it many times in Places much frequented by those Animals, but never saw them meddle with it, nor had I ever one Root either broke, or scratch'd up by them, altho' some *Marum*, which I planted several times in the same Spot, was continually destroy'd.

The other Sorts are also very hardy, and may be propagated in the same manner, but

require a dry Soil in Winter, otherwise they are subject to rot: These all ripen their Seeds in *England* very well; and although there is no great Beauty in them, yet, for Variety, the two *Portugal* Sorts may have a Place amongst Plants of the lower Class, where, if they are kept in Compass, and ty'd up to Sticks, they will make a tolerable Appearance for a long time.

CATCH-FLY; *vide* *Lychnis*.

CATERPILLARS.

There are several Kinds of this Insect which are very pernicious to a Garden, but there are two Sorts which are the most common and destructive to young Plants, one of them is that which the white *Butterfly* breeds: It is of a yellowish Colour, spotted with Black, and commonly infests the tender Leaves of *Cabbages*, *Colliflowers*, and the *Indian Cress*: This eats off all the tender Parts of the Leaves, leaving only the Fibres intire; so that very often we see, in the *Autumn* Season, whole Gardens of Winter *Cabbages* and *Savoy*s almost destroy'd by them, especially in those which are crowded with Trees, or are near great Buildings: Nor is there any other Method found out to destroy them, that I know of, but to pick them off the Plants before they are spread from their Nests; by which Means, tho' perhaps many may be overlook'd, yet their Numbers will be greatly diminish'd: But this Work must be often repeated during the warm Weather that the *Butterflies* are abroad, which are continually depositing their Eggs, and in a few Days time will be metamorphos'd to perfect *Caterpillars*: But as these for the most part feed upon the outer Leaves of Plants, so they are more easily taken than the other Sort, which is much larger; the Skin is very tough, and of a dark Colour; This is call'd by the Gardeners a *Grub*, and is exceeding hurtful: The Eggs of this Sort of *Caterpillar* are, for the most part, deposited in the very Heart or Center of the Plant, (especially in *Cabbages*) where after it hath obtain'd its Form, it eats its Way out thro' all the Leaves thereof; and also the Dung being lodg'd between the inclos'd Leaves of the *Cabbages*, gives them an ill Scent.

This Insect also burrows just under the Surface of the Ground, and makes sad Havock with young Plants, by eating them through their tender Shanks, and drawing them into their Holes. This Mischief is chiefly done in the Night: Whenever you observe this, you should every Morning look over your Plat of Plants; and where-ever you see any Plants eat off, stir the Ground round about the Place with your Fingers an Inch deep, and you'll certainly find them out. This is the only Method I know of destroying them.

CATKINS, or JULUS.

This is by the Botanists call'd, *Flos Ametaceus*: It is an Aggregate of Summits, which are join'd together in Form of a Rope or Cats-Tail, and is the Male Flower of the Trees which produce them, as the *Firrs*, *Pines*, *Cedars*, *Walnuts*, *Birch-Tree*, and *Willows*.

CATULUS; with the modern Botanists is us'd to signify the same as *Julus*, i. e. a *Palm* or *Catkin*.

CAUCALIS; Bastard-parsley.

This is one of the Umbelliferous Plants, with oblong Seeds, which are a little furrow'd and prickly: The Petals of the Flower are unequal and heart-shap'd.

There are several Species of this Plant preserv'd in the Botanick Gardens; but as there is no great Beauty or Use in any of them, so I shall pass them over with only observing, that if any Person hath a Mind to cultivate them, the best Season to sow their Seeds is in *Autumn* soon after they are ripe; for if their Seeds are kept till *Spring*, they seldom produce ripe Seeds again: They are most of them Annuals, and so require to be sown every year: We have five or six Species of them which grow wild in *England*.

CAULIFEROUS Plants; [of *Cauli*, Lat. a *Stalk*, and *fero*, to bear.] Such Plants as have a true Stalk.

CAULIS; is that which rises single above the Earth, from whence the Leaves or little Branches put forth, as *Jungius* defines it; or it is the upper Part of a Plant stretched forth to a Height, so that the Fore-parts differ not from the Hind, nor the Right from the Left: In Trees and Shrubs it is called *Caudex*; in Corn *Culmus*; the *Stalk* of any Herb; the Stem, Trunk or Body of a Tree, Lat.

CEDAR of BERMUDAS; *vide* *Juniperus*.

CEDAR of CAROLINA; *vide* *Juniperus*.

CEDAR of JAMAICA; *vide* the Appendix.

CEDAR of VIRGINIA; *vide* *Juniperus*.

CEDRUS LIBANI; the Cedar of Libanus.

The Characters are;

It is ever-green: The Leaves are much narrower than those of the Pine-tree are many of them produc'd out of one Tubercle, somewhat resembling a Painter's Pencil: It hath Male Flowers (or Catkins) which are produc'd at remote Distances from the Fruit on the same Tree; the Seeds are produc'd in Cones, which are large, squamose and turbinated.

CEDRUS; *magna*, five *Libani*, *Conifera*, J. B. The Cedar of Libanus bearing Cones.

Many, I doubt not, will be surpriz'd that I should retain the Name of Cedar to this Tree, since Monsieur *Tournefort* hath plac'd this with the *Larch*-tree, and the Name Cedar being now appropriated to a Berry-bearing Tree; but I have observ'd a material Difference, in the Manner of Flowering and Fructification, between the *Larch* and this Tree: And since this is generally believ'd to be the Cedar mention'd in Scripture, so consequently, if Preference is given to Antiquity, this hath the greatest Right to the Name: I shall therefore beg Leave to distinguish the other by the Name of *Berry-bearing*.

bearing Cedar, in the next Article, and for Distinction-sake, this may be call'd *Cone-bearing Cedar*.

The Cones of this Tree are brought from the *Levant*, which, if preserv'd intire, will continue their Seeds for several Years: The Time of their ripening is commonly in the Spring, and so consequently are near one Year old before we receive them, for which they are not the worse, but rather the better, the Cones having discharg'd a great Part of their Resin by lying, and the Seeds are much easier to get out of them than such as are fresh taken from the Tree.

The best Way to get the Seeds out is to split the Cones, by driving a sharp Piece of Iron through the Center length-ways, and so pull the Seeds out with your Fingers, which you'll find are fasten'd to a thin leafy Substance, as are those of the *Firr-Tree*.

These Seeds should be sown in Boxes or Pots of light fresh Earth, and treated as was directed for the *Firrs* (to which I refer the Reader); but only shall observe, that these require more Shade in Summer than the *Firrs*, and the sooner they are planted into the open Ground, the better.

When these Plants begin to shoot strong, you'll always find the leading Shoot incline to one Side; therefore if you intend to have them strait, you must support them with Stakes, observing to keep the Leader always close ty'd up, until you have gotten them to the Height you design them, otherwise their Branches will extend on every Side, and prevent their growing tall.

These Trees are by many People kept in Pyramids, and shear'd as Yews, &c. in which Form they lose their greatest Beauty; for the Extension of the Branches are very singular in this Tree, the Ends of their Shoots, for the most part, declining, and thereby shewing their upper Surface, which is constantly cloath'd with green Leaves in so regular a manner, as to appear, at some Distance, like a green Carpet, and these waving about with the Wind, make one of the most agreeable Prospects that can be to terminate a *Vista*, especially if planted on a rising Ground.

It is Matter of Surprize to me, that this Tree hath not been more cultivated in *England*, than at present we find it; since it would be a great Ornament to barren bleak Mountains, where few other Trees would grow; it being a Native of the coldest Parts of *Mount Libanus*, where the Snow continues most part of the Year. And from the Observations I have made of these now growing in *England*, I find they thrive best on the poorest Soil: For such of them as have been planted in a strong, rich, loamy Earth, have made but a poor Progress, in Comparison to such as have grown upon a stony, meagre Soil. And that these Trees are of quick Growth, is evident from four of them now growing in the *Physick-Garden* at *Chelfea*, which (as I have been credibly inform'd) were planted there in the Year 1683, and at that time were not above three Feet high; two of which Trees

are at this time (*viz.* 1729) upwar's of nine Feet in Girt at two Feet above Ground; and their Branches extend more than twenty Feet on every Side their Trunks; which Branches (though produc'd eight or ten Feet above the Surface, do at their Termination hang very near the Ground) and thereby afford a goodly Shade in the hottest Season of the Year.

The Soil in which these Trees are planted is a lean hungry Sand, mix'd with Gravel, the Surface of which is scarcely two Feet deep before a hard rocky Gravel appears. These Trees stand at four Corners of a Pond, which is brick'd up within two Feet of their Trunks, so that their Roots have no Room to spread on one Side, and so consequently are cramped in their Growth: But whether their standing so near the Water may not have promoted their Growth, I can't say; but sure I am, if their Roots had *had* full Scope in the Ground, they would have made a greater Progress. I have also observ'd, that Lopping or Cutting of these Trees is very injurious to them, (more, perhaps, than to any other of the Resinous Trees) in retarding their Growth; for two of the four Trees above-mention'd, being unadvisedly planted near a Green-house, when they began to grow large, had their Branches lopp'd, to let the Rays of the Sun into the House, whereby they have been so much check'd, as at present they are little more than half the Size of the other two.

These Trees have all of them produc'd, for some Years, large Quantities of *Katkins* (or Male Flowers); tho' there is but one of them which hath as yet produc'd Cones; nor is it above four or five Years that this hath ripen'd the Cones, so as to perfect the Seed: But since we find that they are so far naturaliz'd to our Country, as to produce ripe Seeds, we need not fear of being soon supply'd with Seeds enough, without depending on those Cones which are brought from the *Levant*; since there are many Trees of this Kind in *England*, which in a few Years must certainly bear: But I find they are more subject to produce and ripen their Cones in hard Winters, than in mild ones; which is a plain Indication that they will succeed, even in the coldest Parts of *Scotland*, where, as well as in *England*, they might be propagated to great Advantage.

What we find mention'd in Scripture of the lofty Cedars, can be no ways applicable to the Stature of this Tree; since, from the Experience we have of those now growing in *England*, as also from the Testimony of several Travellers who have visited those few remaining Trees on *Mount Libanus*, they are not inclin'd to grow very lofty, but, on the contrary, extend their Branches very far: To which the Allusion made by the *Psalmist* agrees very well, when he is describing the flourishing State of a People, and says, *They shall spread their Branches like the Cedar Tree*.

Rouwolf, in his *Travels*, says, there was not at that Time (*i. e.* Anno 1574.) upon *Mount Libanus* more than 26 Trees remaining, 24 of which stood in a Circle; and the other two,

which

which stood at a small Distance, had their Branches almost consum'd with Age: Nor could he find any younger Trees coming up to succeed them, tho' he look'd about diligently for some: These Trees (he says) were growing at the Foot of a small Hill, on the Top of the Mountains, and amongst the Snow. These having very large Branches, do commonly bend the Tree to one Side, but are extended to a great Length, and in so delicate and pleasant Order, as if they were trimm'd and made even with great Diligence; by which they are easily distinguish'd at a great Distance from *Fir-Trees*. The Leaves (continues he) are very like to those of the *Larch-Tree*, growing close together in little Bunches, upon small brown Shoots.

Maundrel, in his *Travels*, says, There were but sixteen large Trees remaining, some of which were of a prodigious Bulk, but that there were many more young Trees of a smaller Size; he measur'd one of the largest, and found it to be twelve Yards six Inches in Girth, and yet found, and thirty-seven Yards in the Spread of its Boughs. At about five or six Yards from the Ground it was divided into five Limbs, each of which was equal to a great Tree. What *Maundrel* hath related, was confirmed to me by a worthy Gentleman of my Acquaintance, who was there in the Year 1720, with this Difference only, viz. in the Dimensions of the Branches of the largest Tree, which, he assur'd me, he measur'd, and found to be twenty-two Yards diameter. Now, whether Mr. *Maundrel* meant thirty-seven Yards in Circumference of the spreading Branches, or the Diameter of them, cannot be determined by his Expressions, yet neither of them well agree with my Friend's Account.

Monsieur le Bruyn reckons about thirty-five or thirty-six Trees remaining upon *Mount Libanus* when he was there, and would persuade us it was not easy to reckon their Number, (as is reported of our *Stonehenge* on *Salisbury-Plain*.) He also says, their Cones do some of them grow dependent. Which is abundantly confuted by the above-mention'd Travellers, as also from our own Experience; for all the Cones grow upon the upper Part of the Branches, and stand erect, having a strong woody Central Style, by which it is firmly annex'd to the Branch, so as with Difficulty to be taken off; which Central Style remains upon the Branches after the Cone is fallen to Pieces; so that they never drop off Whole, as the *Pines* do.

The Wood of this famous Tree is accounted Proof against all Putrefaction of Animal Bodies; The Saw-dust of it is thought to be one of the Secrets used by those Mountebanks who pretend to have the embalming Mystery. This Wood is also said to yield an Oyl which is famous for preserving Books and Writings: And the Wood is thought, by my Lord *Bacon*, to continue above a thousand Years sound. It is also recorded, that in the Temple of *Apollo Ulica* there was found Timber of near two thousand Years old. And the Statue of the Goddess in the famous *Ephesian* Temple,

was said to be of this Material also, as was most of the Timber-work of that glorious Structure.

This Sort of Timber is very dry, and subject to split; nor does it well endure to be fasten'd with Nails, from which it usually shrinks, therefore Pins of the same Wood are much preferable.

CEDRUS BACCIFERA; Berry-bearing Cedar.

The Characters are;

The Leaves are squamose, somewhat like those of the *Cypress*: The Katkins (or Male Flowers) are produced at remote Distances from the Fruit on the same Tree: The Fruit, is a Berry, inclosing three hard Seeds in each.

The Species are;

1. CEDRUS; folio Cypressi, major, fructu flavescente. C. B. The yellow Berry-bearing Cedar.

2. CEDRUS; folio Cypressi, media, majoribus baccis. C. B. The Phœnician Cedar.

These Trees are propagated by sowing their Berries (which are brought from the *Streights*) in Boxes of light sandy Earth, which should be expos'd to the Morning-Sun only during the Summer-Season, but must be remov'd into Shelter in Winter. These Seeds seldom appearing till the second Year, we should be careful not to disturb the Earth in the Boxes; and if in the *March* following, we put the Boxes upon a gentle Hot-bed, it will greatly forward their coming up, by which the Plants will be strengthen'd before the following Winter, and so more likely to stand, though it will be advisable to shelter them at least the two first Winters while they are young: The Spring following, after their coming up, you should remove them into single Pots, for their better transplanting hereafter. The best Season for this Work is in *April*; at which Time, if you make a gentle Hot-bed in some close Place shelter'd from Winds, and set the Pots with the fresh-planted Trees thereon, covering them with Mats for a Month or six Weeks until they are settled and have taken fresh Roots; this will be a certain Method to make them strike Root, provided they are carefully taken up without breaking their Roots: In this Place they may remain (if it is not too much expos'd to the Sun) till Autumn; at which Time the Pots should be put under a *Cucumber-Frame*, so that in good Weather they may be expos'd to the open free Air; but in frosty, or over-wet Weather, they may be cover'd with the Glasses: If these Precautions are used, in three or four Years Time the Plants will be fit to transplant into the full Ground; you should therefore contrive to plant them in a light sandy Soil, and a Situation that is screen'd from the North-East Winds, observing to shake them out of the Pots with all the Earth to their Roots: This should be perform'd in *April* or *May*, always chusing a moist Season; and when you have planted them, lay a little Mulch upon the Surface of the Ground round about their Roots, to prevent the Sun and Wind from entering the Ground so as to dry the

the Fibres of the Roots, giving them some Water to settle the Earth to their Roots, and repeating the same once a Week if the Weather should be dry; and it will be proper to add a little fresh Mulch about these Trees in *October*, to keep the Frost from penetrating to their Roots: This may be repeated the three first Winters after planting out, after which Time they will have taken sufficient Root in the Ground, so as to be able to endure our Cold very well; and it is by the Neglect of this at first that many young Trees miscarry in Winter at their first planting Abroad.

These Trees are, at present, very rare, and only to be found in some curious old Collections; their Seeds having not been brought into *England* of late Years, there are no young Plants to be met with, though this Tree will take by Layers; but they will never thrive so well as those rais'd from Seeds, and they are commonly two Years before they strike Root.

The Wood of this Tree is of great Use in the *Levant*, where they grow to be large Timber, and is by many thought to be the *Shittim-wood* mention'd in the Scripture, of which many of the Ornaments to the famous Temple of Solomon were made: It is accounted excellent Wood for Carving, as also for many Sorts of Utensils, and is thought to be equal to almost any Sort of Timber for Durableness.

CELASTUS, the Staff-tree: Is a Sort of *Alaternus*.

CELERY, or **SALARY**; *vulgô*.

This is by the Botanists rang'd under the Article of *Apium*, to which I refer the Reader for its Characters.

There are two Sorts of this Plant cultivated in the *English* Gardens, for Kitchen-Use, which are,

1. **APIUM**; *dulce*, *Celeri Italorum*. *H. R.* Par. Italian Celery.

2. **APIUM**; *dulce degener, radice rapaced.* *Jessieu*. Celeryack; *vulgô*.

The Seeds of this Plant should be sown at two different Seasons, the better to continue it for Use through the whole Season without running up to Seed. The first Sowing should be in the Beginning of *March*, which ought to be in an open Spot of light Earth, where it may enjoy the Benefit of the Sun: But the second Time of sowing should be the Beginning of *April*, which ought to be in a moist Soil; and if expos'd to the Morning Sun only, it will be so much the better; but it should not be under the Drip of Trees.

In about three Weeks or a Month's-time after sowing, the Seeds will come up, when you must carefully clear it from Weeds; and if the Season prove dry, you must frequently water it; and in about a Month or five Weeks after it is up, the Plants will be fit to transplant; you must therefore prepare some Beds of moist rich Earth, in which you should prick these young Plants, at about three Inches square, that they may grow strong: You must also observe, in drawing these Plants out of

the Seed-Beds, to thin them where they grow too thick, leaving the small Plants to get more Strength before they are transplanted, by which Means one and the same Seed-Bed will afford three different Plantings, which will accordingly succeed each other for Use.

You must observe, if the Season proves dry, to keep it diligently water'd after 'tis transplanted, as also to clear the Seed-Beds from Weeds; and after every drawing, keep them duly water'd, to encourage the small Plants left therein.

The Middle of *June* some of the Plants of the first sowing will be fit to transplant for Blanching; which, if possible, should be put into a moist, rich, light Soil, upon which this first planted Celery will often grow to be twenty Inches long in the clean blanch'd Parts, which upon a poor or dry Soil seldom rises to be ten Inches.

The Manner of transplanting it is as follows; After having clear'd the Ground of Weeds, you must dig a Trench by a Line about ten Inches wide, and eight or nine Inches deep, loosening the Earth in the Bottom, and laying it level, and the Earth that comes out of the Trench should be equally laid on each side the Trench, to be ready to draw in again to earth the Celery as it advances in Height: These Trenches should be made at three Feet Distance from each other; then plant your Plants in the Middle of the Trench, at about six Inches Distance, in one strait Row, having cut off the Tops of the long Leaves, as also trim'd their Roots, observing to close the Earth well to their Roots, and to water them plentifully until they have taken fresh Root; after which time it will be needless, except in dry Soils, or very dry Seasons: As these Plants advance in Height, so you must observe to draw the Earth on each Side close to them, being careful not to bury their Hearts, nor ever to do it but in dry Weather, otherwise the Plants will rot.

When your Plants have advanc'd a considerable Height above the Trenches, and all the Earth which was laid on the Sides thereof, hath been employ'd in earthing them up; you must then make use of a Spade to dig up the Earth between the Trenches, which must also be made use of for the same Purpose, continuing from time to time to earth it up, until it is fit for Use.

The first of your planting out will, perhaps, be fit for Use a little after Midsummer, and so this will be succeeded by the after Plantations, and, if rightly manag'd, will continue till *April* or *May*; but you should observe, after the second or third planting out, to plant the After-crop in a drier Soil, to prevent its being rotted with too much Wet in Winter; and also if the Weather should prove extreme sharp, you will do well to cover your Ridges of Celery with some Pease Haulm, or some such light Covering, which will admit the Air to the Plants; for if they are cover'd too close, they will be very subject to rot; by this Means you may preserve your Celery in Season a long time; but you must remember to take off the Covering whenever the Weather will permit, otherwise

otherwise it will be apt to cause the *Celery* to pipe and run to Seed: The *Celery*, when fully blanch'd, will not continue good above three Weeks or a Month before it will rot or pipe; therefore, in order to continue it good, you should have, at least, six or seven different Seasons of planting; so that if it be only intended to supply a Family, there need not be much planted at each Time; but this must be proportion'd according to the Quantity requir'd.

The other Sort of *Celery*, which is commonly call'd *Celeriack*, is to be manag'd in the same Manner as is directed for the *Italian Celery*, but should not be sown until the Latter-end of *March*, and is very proper for the two last Plantations for blanching, as being much hardier than the *Italian* Sort, and will stand until *June* before it begins to pipe, (or run to Seed); by which means you may continue this Plant for Use almost two Months longer than is ordinarily done, and, with some Care, it may be continued good through the whole Year.

The best Method to save this Seed, is to make choice of some long good Roots of *Celery* that have not been too much blanch'd, and plant them out at about a Foot asunder in a moist Soil, early in the Spring; and when they run up to Seed, keep them supported with Stakes, to prevent their being broke down with the Wind: And in *July*, when this Seed begins to be form'd, if the Season should prove very dry, it will be proper to give it a little Water, which will greatly help its producing good Seeds. In *August* these Seeds will be ripe; at which time it should be cut up, in a dry Time, and spread upon Cloths in the Sun to dry; then beat out the Seeds, and preserve it dry in Bags for Use.

CELLS of Plants, [of *Cellæ*, Lat.] are those Partitions or hollow Places in the Husks or Pods of Plants in which the Seed is contain'd.

CELTIS; the Lote, or Nettle-tree.

The Characters are;

The Leaves are somewhat like those of the Nettle: The Flowers consist of five Leaves, which are expanded in Form of a Rose, containing many short Stamina (or Threads) in the Bosom: The Fruit grows single in the Bosom of its Leaves, which is a roundish Berry.

The Species are;

1. **CELTIS**; *fructu obscure purpurascente*. Tourn. The dark-purplish-fruited Lote or Nettle-Tree.

2. **CELTIS**; *fructu nigricante*. Tourn. The Nettle-Tree with black Fruit.

3. **CELTIS**; *fructu luteo ampliori*. The Nettle-Tree with large yellow Fruit.

The first of these Trees was originally brought from *Virginia*, but is found to thrive very well in our Climate; there being several large Trees of this Kind in the Gardens of curious Planters, but particularly one in the Garden which formerly belong'd to *John Tradescant* at South-

Lambeth near *Vaux-Hall* in *Surry*, and another in the *Physick-Garden* at *Chelfea*, both which are large Trees, and the latter produces ripe Fruit annually, from whence several young Trees have been rais'd. The second Sort, tho' a Native of *Europe*, yet is less common in *England* than the former, and only to be seen in some curious Collections of Trees, particularly in the Gardens of the late *Dr. Uvedale* at *Enfield*, where there is one large Tree remaining.

The third Sort is probably a Native of *America* also; this Tree hath been many Years growing in *Devonshire*, where are several large ones, which have produced ripe Seeds, from whence the Gardens near *London* were supply'd with young Plants.

These are all of them very hardy, enduring the severest of our Winters in *England* very well, and grow to be large Trees; they may be propagated either from Layers, or by Seeds: The Layers are commonly two Years before they take Root sufficient for transplanting; and if they are not frequently water'd, will rarely take Root. The best Time for transplanting these Trees is in *March*, just before they begin to put out, observing to mulch their Roots, and water them well until they have taken Root. This Tree seems to thrive best upon a moist Soil, tho' it will grow tolerably well upon almost any Soil, when it is well fix'd therein.

The Seeds of this Tree should be sown in the Spring of the Year, soon after they are ripe, which is commonly in *January*, and the Ground kept clear from Weeds, but not stir'd; for the Seeds seldom appear before the second Spring: Therefore the best Method is, to sow them in Boxes, and manage them as was directed for the *Berry-bearing Cedar*; to which I refer the Reader, to avoid Repetition.

These Trees are very useful in forming Clumps, or for planting of Amphitheatres of various Kinds of deciduous Trees; for the Heads of these naturally grow very thick and regular, and their Leaf is of a deep pleasant Green Colour, making a very good Diversity amongst other Kinds: And altho' it is none of the earliest Trees in putting out in the Spring of the Year, yet it recompenseth for this Defect, by its long Continuance in the Autumn, retaining its Leaves in perfect Vigour, when few other deciduous Trees have any Leaves left upon them.

The Fruit of this Tree is not so tempting with Us, as is story'd it was to the Companions of *Ulysses*: But the Wood is reckon'd to be of a very durable Nature, and is commonly us'd to make Pipes, and other Wind-Instruments, and its Root is very proper to make Hafts for Knives, and other Tools; and it is reported, that they were held in great Esteem by the *Romans*, for their incomparable Beauty and Use.

CENTAURIUM MAJUS. [This Plant takes its Name of the Centaur *Chiron*, who is said to have been heal'd of the Wound in his Foot thereby. It is also call'd *Rhaponticum*; because

because it is by many thought to be the Purging *Rhaponticum*.] The greater Centaury.

The Characters are ;

It is one of the *Plantæ Capitatae*, (or, of those Plants whose Flowers are collected into a Head; as the Thistle, &c.) and hath a perennial Root: Their Leaves are without Spines, and are saw'd on their Edges: The Cup of the Flower is squamose, but hath no Spines: The Florets are large and specious.

The Species are ;

1. *CENTAURIUM*; *majus, folio belenii incano*. Tourne. Greater Centaury, with hoary Leaves like those of Elecampane.

2. *CENTAURIUM*; *folio cinaræ*. Cornut. Greater Centaury, with Artichoke Leaves.

3. *CENTAURIUM*; *majus, Alpinum, luteum*. C. B. Greater yellow Centaury of the Alps.

4. *CENTAURIUM*; *majus, folio in laciniis plures diviso*. C. B. Greater Centaury with cut Leaves.

5. *CENTAURIUM*; *majus, alterum, laciniatum, purpurascens flore*. H. R. Par. Another cut-leav'd Centaury with purplish Flowers.

6. *CENTAURIUM*; *majus, orientale, erectum, glastii folio, flore luteo*. T. Cor. Greater Eastern Centaury with Leaves like Woad, and yellow Flowers.

7. *CENTAURIUM*; *majus, Africanum, acaulon, cinaræ folio*. Jussieu. Greater African Centaury without Stalks, and Leaves like the Artichoke.

There are several other Species of this Plant cultivated in some of the Botanick Gardens Abroad; but these here mention'd are what we have at present in the English Gardens.

They are all of them propagated either by sowing their Seeds, or parting their Roots: The latter of which is most commonly practis'd in England, (their Seeds seldom ripening in our Country). The best Season for this Work is either in October or February.

When you have a mind to increase any of these Plants, you should open the Ground about their Roots, and clear them of the Earth: Then, where you find any of the Side-Heads, which will part with Roots to them, you should carefully force them off; which when you have done, you must lay the Earth up again to the old Plant, settling it close with your Hands; and if the Ground is dry, give it a little Water: And having prepar'd a proper Place for the young Plants, which should be in a dry sandy Soil, and a warm Situation, you may either plant them in Beds, at about a Foot square, or at Distances in the Borders of large Gardens, by way of Ornament; which altho' the Flowers have no very great Beauty, yet the regular Growth of the Plants, together with their long Continuance in Flower, render them worthy of a Place in all large Gardens.

The Season for sowing the Seeds of any of these Species, is in March, in an open Bed of common light Earth; and in May, when the Plants are come up, they may be transplanted into Nursery-beds until Michaelmas; by which Time they will have gotten Strength enough

to transplant into any other Parts of the Garden where you design them to remain.

The third, sixth, and seventh Sorts are the most valuable for a Pleasure-Garden, as being less subject to grow rude and ungovernable; and their Flowers are of a long Duration. The third Sort is the largest of the three, and should be planted in the Middle of large Borders, where they will look very handsome.

The fourth Sort is used in Medicine, and therefore deserves to be cultivated in Physick-Gardens: Nor is it unpleasant in any Garden. The first and second Sorts may be admitted for a Variety in large Gardens, to fill empty Borders, where the Difference of their Leaves and Flowers will appear very well amongst Plants of larger Growth. These Plants begin to produce their Flowers in June, and continue most part of July, but very rarely produce ripe Seeds in this Country.

CENTAURIUM MINUS. [This is call'd *Fel Terra*, because of its great Bitterness.] Lesser Centaury.

The Characters are ;

The Leaves grow by Pairs, opposite to each other: The Flower consists of one Leaf, is funnel-shap'd, and divided into five acute Segments; these grow on the Tops of the Stalks in Clusters: The Seed-vessel is of a cylindrical Form, and is divided into two Cells, in which are contain'd many small Seeds.

The Species are ;

1. *CENTAURIUM minus*. C. B. Common Lesser Centaury.

2. *CENTAURIUM*; *minus, flore albo*. H. Eyf. Lesser Centaury with white Flowers.

3. *CENTAURIUM*; *luteum, perfoliatum*. C. B. Lesser yellow Centaury, with Leaves surrounding the Stalks.

These three Plants grow wild in England: The first is commonly found growing upon dry arable Land, chiefly amongst Corn. The second is a Variety of the first, from which it only differs in the Colour of the Flower: This is sometimes found with the first. The third Sort grows commonly upon chalky Hills in divers Parts of England: But neither of these Kinds care to grow in a Garden. The only Method that can be taken to cultivate these, is to sow the Seeds as soon as they are ripe, in an open well-expos'd Place, and in a poor dry Soil, with which these Plants agree: Nor should the young Plants be remov'd, if they come up, but suffer'd to remain in the same Places for good. The first Sort is us'd in Medicine, and is gather'd in the Fields, and brought to Market for that Purpose.

CENTINODIUM, is Knot-grass.

CEPA; the Onion.

The Characters are ;

It hath an orbicular, coated, bulbous Root: The Leaves are hollow or pipy: The Stalk is also hollow, and swells out in the Middle: The Flowers, which consist of six Leaves, are collected into a spherical Head, or Corymbus: The

Style

Style of the Flower becomes a roundish Fruit, which is divided into three Cells, containing roundish Seeds.

The Species are;

1. *CEPA*; *oblonga*. C. B. The Strasburgh Onion; *vulgô*.
2. *CEPA*; *vulgaris*, *floribus & tunicis purpurascens*. C. B. The Red Spanish Onion; *vulgô*.
3. *CEPA*; *vulgaris*, *floribus & tunicis candidis*. C. B. The white Spanish Onion; *vulgô*.
4. *CEPA*; *Ascalonica*; *Matthioli*. Boerb. Ind. The Scallion or Escallion.
5. *CEPA*; *scutellaria*, *juncifolia*, *perennis*. M. H. Cives.
6. *CEPA*; *scutellaria*, *major*, *perennis*. Welsh Onion; *vulgô*.
7. *CEPA*; *scutellaria* *Matthioli*. Lugd. Ciboule.

There are several other Sorts of Onions of lesser Note, which are preserv'd in the Gardens of curious Botanists, some of which grow wild in England: But these above-mention'd are the Sorts which are chiefly cultivated for the Kitchen Use. The three Sorts first mention'd are propagated for Winter Use, their Roots being preserv'd dry during that Season. Of these I shall first treat.

These three Sorts of Onions are propagated by Seeds, which should be sown at the Latter-end of February, or the Beginning of March, in good rich sandy Ground (but not too thick; the common Quantity of Seed allow'd to sow an Acre of Ground being eight Pounds) in about a Month or six Weeks after sowing, the Onions will be up forward enough to hoe; at which Time (choosing dry Weather) you should with a small hoe about two Inches and an half broad, cut up lightly all the Weeds from amongst the Onions; as also cutting out the Onions where they grow too close in Bunches, leaving them at this first hoeing two Inches apart: This, if well perform'd, and in a dry Season, will preserve the Spot clear of Weeds, at least a Month, at which Time you must hoe them over a second time, cutting up all the Weeds, as before, and also cutting out the Onions to a larger Distance, leaving them this time three Inches asunder. This also, if well perform'd, will preserve the Ground clean a Month longer, when you must hoe them over the third and last time.

You must now carefully cut up all Weeds, and single out the Onions to near four Inches square; by which means they will grow much larger than if left too close. This Time of Hoeing, if the Weather proves dry, and it was well perform'd, will keep the Ground clean until the Onions are fit to pull up: But if the Weather should prove moist, and any of the Weeds should take Root again, you should, about a Fortnight or three Weeks after, go over the Spot, and draw out all the large Weeds with your Hands; for the Onions having now begun to bulb, they should not be disturb'd with a Hoe.

Toward the Middle or Latter-end of July your Onions will have arriv'd to their full Growth, which may be known, by their Blades falling to the Ground and shrinking; you

should therefore, before their Necks or Blades are wither'd off, draw them out of the Ground, cropping off the extreme Part of the Blade, and lay them abroad upon a dry Spot of Ground to dry, observing to turn them over every other Day, at least, to prevent their striking fresh Root into the Ground; which they will suddenly do, especially in moist Weather.

In about a Fortnight's Time your Onions will be dry enough to house, which must be perform'd in perfect dry Weather: In doing of this, you must carefully rub off all the Earth, and be sure to mix no faulty ones amongst them, which will in a short time decay, and spoil all those that lie near them; nor should you lay them too thick in the House, which would occasion their sweating, and thereby rot them: These should not be put in a lower Room, or Ground-floor, but in a Loft or Garret; and the closer they are kept from the Air the better they will keep: You should at least once a Month look over them to see if any of them are decay'd; which if you find, must be immediately taken away, otherwise they will infect all that lie near them.

The best Onions for keeping are the Strasburgh kind, which is an oval-shap'd Bulb; but this seldom grows so large as the Spanish, which is flatter: The white Sort is esteem'd the sweetest, but these Varieties are not lasting, for if you save Seeds of white Onions only, you will have a Mixture of the red ones amongst them; nor will the Strasburgh Onion keep long to its Kind, but will by degrees grow flatter, as do the large Portugal Onions, when planted in our Climate, which, in a Year or two, will be so far degenerated as not to be known they were from that Race.

But, in order to preserve Seeds, you must in the Spring make Choice of some of the firmest, largest, and oval-shap'd Onions, (in Quantity proportionable to the Seed you intend to save) and having prepar'd a Piece of good Ground, (which should be well dug, and laid out in Beds about three Feet wide) in the Beginning of March you must plant your Onions, in the following manner: Having strain'd a Line about four Inches within the Side of the Bed, you must with a Spade, throw out an Opening about six Inches deep the Length of the Bed, into which you should place the Onions, with their Roots downward, at about six Inches Distance from each other; then with a Rake draw the Earth into the Opening again to cover the Bulbs; then proceed to remove the Line again about ten Inches or a Foot farther back, where you must make an Opening as before, and so again, till the Whole is finish'd, so that you will have four Rows in each Bed, between which you must allow a Space of two Feet for an Alley to go amongst them to clear them from Weeds, &c. In a Month's Time these Bulbs will appear above-ground, many of which will produce three or four Stalks each, you must therefore keep them diligently clear'd from Weeds, and about the Beginning of June, when the Heads of the Seed begin to appear upon

upon the Tops of the Stalks, you must provide a Parcel of Strakes about four Feet long, which should be drove into the Ground, in the Rows of *Onions*, at about six Feet apart, to which you should fasten some Packthread, or small Cord, which should be run on each Side the Stems of the *Onions* a little below their Heads, to support them from breaking down with the Wind and Rain.

About the Beginning of *August* the *Onion*-Seed will be ripe, which may be known by its changing brown, and the Cells in which the Seeds are contain'd opening, so that if it be not cut in a short time the Seeds will fall to the Ground: When you cut off the Heads, they should be spread abroad upon coarse Cloaths in the Sun, observing to take it in under Shelter in the Night, as also in wet Weather; and when the Heads are quite dry, you must beat out the Seeds, which are very easily discharg'd from their Cells; then having leav'd it from all the Husk, &c. after having expos'd it one Day to the Sun to dry, you must put it up in Bags to preserve it for Use.

The *Scallion* or *Escalot*, is a Sort of *Onion* which never forms any Bulbs at the Roots, and is chiefly used in the Spring for green *Onions*, before the other Sorts sown in *July* are big enough; but this Sort of *Onion*, how much soever in use formerly, is now so scarce as to be known to few People, and is rarely to be met with except in curious Botanick Gardens: The Gardeners near *London* substitute another Sort for this, which are those *Onions* which decay and sprout in the House: These they plant in a Bed early in the Spring, which in a short time will grow to be large enough for Use: When they draw them up, and after pulling off all the old outer Coat of the Root, they tie them up in Bunches, and sell them in the Market for *Scallions*:

This Sort is easily propagated by parting the Roots, either in *Spring* or *Autumn*, but the latter Season is preferable, because of their being render'd more fit for Use in the *Spring*: These Roots should be planted three or four together in a Hole, at about six Inches Distance every Way, in Beds or Borders three Feet wide, which in a short time will multiply exceedingly, and will grow upon almost any Soil and in any Situation; and their being so hardy as to resist the severest of our Winters, and being green and fit for Use so early in the *Spring*, renders them worthy of a Place in all good Kitchen-Gardens.

The *Cives* are a very small Sort of *Onion*, which never produces any Bulbs, nor seldom grows above six Inches high in the Blade, which is very small and slender, and grows in Bunches like the former: This was formerly in great Request for *Sallads* in the Spring, as being somewhat milder than those *Onions* which had stood through the Winter: These are propagated by parting their Roots like the former, and are also very hardy, and will be fit for Use early in the Spring.

The *Welsh Onions* are only propagated for *Spring* Use also: These never make any Bulb,

and are therefore only fit to be us'd green for *Sallads*, &c. They are sown about the End of *July*, in Beds of about three Feet and a half wide, leaving Alleys of two Feet broad to go between the Beds to clean them, and in a Fortnight's Time they will appear above-ground, and must be carefully clear'd from Weeds; towards the Middle of *October*, their Blades will die away, so that the whole Sort will seem to be naked, which hath led many People to dig up the Ground again, supposing the Crop totally lost; whereas if they are let stand undisturb'd they will come up again very strong in *January*, and from that time grow very vigorously, resisting all Weathers, and by *March* will be fit to draw for young *Onions*, and are, in the Markets, more valued than any other Sort at that Season, for they are extremely green and fine, tho' they are much stronger than the common *Onion*, in Taste, approaching nearer to *Garlick*, which hath occasion'd their being less esteem'd for the Table: But as no Winter, however so hard, will hurt them, so it is proper to have a few of them to supply the Table, in case the common Sort should be destroy'd by Frosts.

The Roots of these *Onions*, if planted out at six or eight Inches Distance in *March*, will produce ripe Seeds in *Autumn*, but 'twill be in small Quantities the first Year; therefore the same Roots should remain unremov'd, which the second and third Year will produce many Stems, and afford a good Supply of Seeds: These Roots will abide many Years good, but should be transplanted and parted every second or third Year, which will cause them to produce strong Seeds.

CERASUS; [so call'd of *Cerasus*, a City of *Pentus*, which *Lucullus* having destroy'd, he carry'd the Cherry-Tree from thence to *Rome*, and call'd it *Cerasus*, after the Name of the City.] The Cherry-Tree.

The Characters are;

It hath large shining Leaves; the Fruit grows on long Pedicles (or Footstalks) and is roundish or heart-shap'd; the Stone is short, tumid, and roundish.

The Species are;

1. **CERASUS**; *sativa*, fructu rotundo, rubro & acido. *Tourn.* The common Red, or Garden Cherry.
2. **CERASUS**; *sativa*, fructu majori. *Tourn.* Large Spanish Cherry.
3. **CERASUS**; *major*, fructu magno, cordato, rubro. The Red Heart Cherry.
4. **CERASUS**; *major*, fructu magno, cordato, albo. The White Heart Cherry.
5. **CERASUS**; *major*, fructu magno, cordato, sanguineo. The Bleeding Heart Cherry.
6. **CERASUS**; *major*, fructu cordato, nigro. The Black Heart Cherry.
7. **CERASUS**; *Maialis*, fructu duro, subdulci. *Tourn.* The Mary Cherry.
8. **CERASUS**; *major*, ac si vestris, fructu subdulci, nigro colore inficiente. *C. B.* The Black Cherry, or Mazzard.
9. **CERASUS**; fructu magno, rubro turbinate. *Tourn.* The Archduke-Cherry.
10. **CERA-**

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10. CERA-

10. CERASUS; *Sicula*, fructu *Castanei coloris*. Tourn. The Yellow Spanish Cherry; *vulgô*.

11. CERASUS; *uno pediculo, plura ferens*. J. B. The Flanders Cluster-Cherry.

12. CERASUS; fructu *incarnato*. The Carnation-Cherry.

13. CERASUS; *sativa*, fructu *orbiculato, nigerrimo, micante*. Tourn. The Large Black Cherry.

14. CERASUS; *racemosa, sylvestris, fructu non eduli*. C. B. The Bird-Cherry.

15. CERASUS; *racemosa, sylvestris, fructu non eduli rubro*. H. R. Par. The Red Bird, or Cornish Cherry.

16. CERASUS; *hortensis flore roseo*. C. B. The Largest Double-flower'd Cherry.

17. CERASUS; *hortensis pleno flore*. C. B. The Double-flower'd Cherry.

18. CERASUS; *sylvestris, fructu rubro*. J. B. Common Wild Cherry.

19. CERASUS; *sylvestris, septentrionalis Anglica, fructu rubro, parvo serotino*. Rati. Hist. The Wild Northern English Cherry, with late ripe Fruit.

20. CERASUS; *sylvestris, amara, mahaleb putata*. J. B. The Rock, or Perfum'd Cherry.

21. CERASUS; *hortensis, foliis eleganter variegatis*. The Cherry-Tree with strip'd Leaves.

There are many other Sorts of Cherries cultivated in curious Fruit-Gardens; as, the Amber Cherry, Lukward, Corone, Gascoigne, Morello, &c.

All the Sorts of Cherries which are usually cultivated in Fruit-Gardens, are propagated by Budding or Grafting the several Kinds, into Stocks of the Black, or Wild Red Cherries, which are strong Shooters, and of a longer Duration than any of the Garden Kinds. The Stones of these two Kinds are sown in Beds of light Sandy Earth in Autumn, (or are preserv'd in Sand 'till Spring, and then sow'd): When these Stocks arise, they must be carefully weeded; and if in dry Weather you refresh them with Water, it will greatly promote their Growth. These young Stocks should remain in these Nursery Beds 'till the second Autumn after sowing, at which Time you should prepare an open Spot of good fresh Earth, which should be well work'd: But if the Soil is fresh you'll need no Dung. In this Ground in October you should plant out the young Stocks at three Feet Distance, Row from Row, and about ten Inches asunder in the Rows; being careful, in taking them up from their Seed-beds, to loosen their Roots well with a Spade, to prevent their breaking; as also to prune their Roots: And if they are inclinable to root downwards, you should shorten the Tap-root, to cause it to put out lateral Roots: But do not prune their Tops; for this is what by no means they will endure.

The second Year after planting out, if they take to growing well, they will be fit to bud, if they are intended for Dwarfs: But if they are for Standards, they will not be tall enough until the fourth Year; for they should be budded or grafted near six Feet from the Ground; for otherwise the Graft will not

advance much in height, so that it will be impossible to make a good Tree from such as are grafted low.

The usual Way with the Nursery Gardeners, is to bud their Stocks in Summer: And such of them as miscarry, they graft the succeeding Spring. (The manner of these Operations will be described under their proper Heads). Those Trees where the Buds have taken, must be headed off in the Beginning of March, about six Inches above the Bud: And when the Bud hath shot in Summer, if you fear its being blown out by the Winds, you may fasten it up with some Bais, or such soft-tying, to that Part of the Stock which was left above the Bud. The Autumn following these Trees will be fit to remove. But if your Ground is not ready to receive them, they may remain two Years before they are transplanted: In the doing of which, you must observe, not to head them, as is by many practis'd; for this, very often, is immediate Death to them: but if they survive it, they seldom recover this Amputation in five or six Years.

If these Trees are intended for a Wall, I would advise the planting Dwarfs between the Standards; so that while the Dwarfs are filling the Bottom of the Walls, the Standards will cover the Tops, and will produce a great deal of Fruit: But these, as the Dwarfs arise to fill the Walls, must be cut away, to make room for them: And when the Dwarf-trees do cover the Walls, the Standards should be intirely taken away. But I would advise, Never to plant Standard-Cherries over other Fruits; for there is no other Sort of Fruit that will prosper well under the Drip of Cherries.

When these Trees are taken up from the Nursery, their Roots must be shortned, and all the bruised Parts cut off, as also all the small Fibres, which would dry, grow mouldy, and be a great Prejudice to the new Fibres in their coming forth; you must also cut off the dead Part of the Stock which was left above the Bud, close down to the back-part of it, that the Stock may be cover'd. If these Trees are design'd for a Wall, observe to place the Bud directly from the Wall, that the back-part of the Stock that was cut may be hid from Sight. The Soil that Cherries thrive best in, is a fresh Hazel Loam: But if the Soil is a dry Gravel, they will not live many Years, and will be perpetually blighted in the Spring.

The Sorts commonly planted against Walls, are the *Early May*, and *May-Duke*, which should have a South-Wall. The *Hearts* and *common Duke* will do upon a West-Wall; and the *Morello* on a North-Wall, which last is chiefly planted for preserving. The *Hearts* are all of them ill Bearers; for which Reason they are seldom planted against Walls: But I am apt to believe, if they were grafted upon the *Bird-Cherry*, and manag'd properly, that Defect might be remedy'd; for this Stock (as I am inform'd) will render Cherries very fruitful; and having the same Effect on Cherries, as the *Paradise* Stock hath on Apples, they may be kept in less Compass, which

which is an Experiment well worth the Trial.

Your Trees, if planted against a Wall, should be placed fourteen Feet asunder, with a Standard-Tree between each Dwarf: This will be found a reasonable Distance, when we consider that *Cherry-Trees* will not extend themselves so far as *Apricocks*, and many other Sorts of Fruit.

In pruning these Sorts of Fruits, you should never shorten their Shoots; for the most part of them produce their Fruit-buds at their extreme Part, which, when shortned, are cut off: Their Branches should be therefore train'd in at full length horizontally, observing in May where there is a Vacancy in the Wall, to stop some strong adjoining Branches, which will occasion its putting out two or more Shoots; by which Means, at that Season of the Year, you may always get a Supply of Wood for covering the Wall: And at the same time should all fore-right Shoots be displac'd by the Hand; for if they are suffer'd to grow till Winter, they will not only deprive the Bearing-Branches of their proper Supply of Nourishment, but, when they are cut out, it occasions the Tree to Gum in that Part; (for *Cherries* bear the Knife the worst of any Sorts of Fruit-Trees): but be careful not to rub off the *Fides* or Spurs, which are produc'd upon the two and three Years old Wood; for it is upon these that the greatest part of the Fruit are produc'd; which *Fides* will continue fruitful for several Years. And it is for want of duly observing this Caution, that *Cherry-Trees* are often seen so unfruitful, especially the *Morello*, which, the more it is cut, the weaker it shoots; and at last, by frequent Pruning, I have known a whole Wall of them destroy'd; which, if they had been suffer'd to grow without any pruning, might probably have liv'd many Years, and produc'd large Quantities of Fruit.

Cherry-Trees are also planted for Orchards in many Parts of *England*, particularly in *Kent*, where there are large Plantations of these Trees: The usual Distance allow'd for their standing, is forty Feet square, at which Space they are less subject to Blight, than when they are closer planted; and the Ground may be till'd between them almost as well as if it were intirely clear, especially while the Trees are young; and the often stirring the Ground, provided you do not disturb their Roots, will greatly help the Trees: but when they are grown so big as to overshadow the Ground, the Drip of their Leaves will suffer very few Things to thrive under them. These Standard Trees should be planted in a Situation defended as much as possible from the strong Westerly Winds, which is very apt to break their tender Branches; this occasions their Guming and is very prejudicial to them.

The Sorts best approv'd for an Orchard, are the Common Red or *Kentish Cherry*, the *Duke*, and *Lukeward*, all which are plentiful Bearers. But Orchards of these Trees are now scarcely worth planting, except where Land is very cheap; for the Uncertainty of their Bearing,

with the Trouble in Gathering the Fruit, together with the small Price it commonly yields, have occasion'd the destroying many Orchards of this Fruit in *Kent*, within a few Years past.

This Fruit was brought out of *Pontus*, at the Time of the *Mithridatick* Victory, by *Lucullus*, in the Year of the City 680, and were brought into *Britain* about 120 Years afterwards, which was *An. Dom.* 55, and were soon after spread through most Parts of *Europe*; it being generally esteem'd for its Earliness, as being one of the first of the Tree-Fruit that appears to welcome in the approaching Fruit-season.

This Sort of Fruit hath been by many People grafted upon the *Lavrel*, to which it is a Congener: But what Effect it hath either in the Growth of the Tree, or its Fruit, I have not been yet able to understand; tho' this Practice is as old as *Pliny*, who says it gives the Fruit a very pleasant Bitterness.

The two Sorts of *Bird Cherries* are very fine Flowering Trees, and are commonly propagated in the Nurseries, to intermix with *Lilac's*, *Laburnum's*, and other Flowering Trees of larger Growth, where, by their Variety, they greatly diversify the Prospect. These are also, by some, us'd for Stocks, to bud and graft the more generous Kinds of *Cherries* on; by which means they are render'd more fruitful, and of lesser Growth: These two Sorts are propagated by laying down their tender Branches in Autumn, which in one Year's time will have taken Root, and may be remov'd into a Nursery, for any of the above-mention'd Purposes.

The two Sorts of *Double-flowering Cherries* are also propagated for the Beauty of their Flowers, which, of the very Double Kind, are extremely fine, the Flowers being as double and large as a *Cinnamon-Rose*; and these being produced in large Bunches on every Part of the Tree, renders it one of the most beautiful Trees of the Spring. The other Sort, which is less Double, will often produce some Fruit which the very double Sort doth not; but this Defect is sufficiently recompenc'd, in the Beauty of its Flowers. These are propagated by Budding or Grafting them on the *Black* or *Wild Cherry* Stock, and are proper to intermix with the larger Sort of Flowering Trees.

The *Wild Northern Cherry* is of no Use or Beauty, and is only preserv'd by the Curious, in Collections of the different Sorts of Trees; as is also the *Machaleb* or *Perfum'd Cherry*, which is a free Shooter, and perhaps may serve for Stocks to improve the other Kinds of *Cherries*, as growing well in almost any Soil; but there is neither Use or Beauty in the Flowers or Fruit of it. The *Strip'd-Leav'd Cherry* is proper in a Collection of variegated Trees, as adding to the Variety.

CERATIA; *vidi* Siliqua Edulis.

CEREFOLIUM; *vide* Chærefolium.

CEREUS. The Torch-Thistle.

These are all *American* Plants, where the Fruit are eaten as Figs: They lie in the Way in great

great Plenty, and being Thorny, are injurious to those who pass among them naked. The eleventh as to its outward Shew, seems to be no very rare or curious Plant, but it has a very fine Flower, which beginning to open it self about the Evening, falls after Midnight: and hence it is call'd, *Εκπεφυγας*, i. e. *shunning the Sun*. The tenth Sort bears Figs of a most delicate Taste; it is call'd *Cereus*, because it is, as it were, a kind of *Taper* or *Torch*, which the Servants carry on Nights before their Masters.

Not that it is call'd so from its Resemblance to a *Torch*, but because when these Plants have been cut down, and dry'd upon the Ground, they dip them into Oil, and burn them as *Torches*, for which Purpose they serve very well.

The Characters are ;

It hath no Leaves; the Stems are thick and succulent; are angular and furrow'd, each Angle being arm'd with sharp Spines, which are produc'd in Clusters: The Flowers consist of many flat Leaves, which expand themselves somewhat like a *Marygold*: In the Center of the Flower is produc'd a great Number of Stamina (or Threads) which appear very spacious: The Fruit, which is fleshy, soft, and like to that of the Indian Fig, is produc'd from the Side of the Plant, without any Footstalk, immediately under the Flower.

The Species are;

1. *CEREUS; erectus, altissimus, Syriamenfis. Par. Bat.* The large upright Torch-Thistle from *Surinam*.

2. *CEREUS; erectus, quadrangulus, costis alarum instar assurgentibus. Boerh. Ind.* The four-corner'd upright Torch-Thistle.

3. *CEREUS; erectus, fructu rubro, non spinoso, lanuginosus, lanugine flavescens. Par. Bat.* The upright Torch-Thistle, with yellow Down and red Fruit without Spines.

4. *CEREUS; erectus, crassissimus, maxime angulosus, spinis albis, pluribus, longissimis, lanugine flavâ. Boerh. Ind.* The largest upright Torch-Thistle, with large Angles and white Spines, having a yellow Down on the Top.

5. *CEREUS; erectus, gracilis, spinosissimus; spinis flavis, polygonus, lanugine albâ pallescente. Boerh. Ind.* The lesser upright Torch-Thistle with many Angles and yellow Spines, with a white Down on the Top.

6. *CEREUS; erectus, gracilior, spinosissimus, spinis albis, polygonus. Boerh. Ind.* The lesser upright Torch-Thistle, with white Spines.

7. *CEREUS; erectus; gracilior, minimè angulosus, spinis albis, quorum fasciculi remotiori distantia producuntur.* The lesser upright Torch-Thistle, with the least Angles and white Spines, which are produc'd at a wide Distance.

8. *CERUES; maximus, fructu spinoso rubro. Par. Bat.* The greatest Torch-Thistle, with red prickly Fruit.

9. *CEREUS; scandens, minor, trigonus, articulatus, fructu suavissimo. Par. Bat.* The lesser triangular creeping, joynted Torch-Thistle, with the sweetest Fruit, commonly call'd in *Barbadoes*, the True prickly Pear.

10. *CEREUS; cristatus, erectus, foliis tri-*

angularibus, profundè canaliculatis. Pluk. Phyt. The crested triangular Torch-Thistle, with deep Furrows.

11. *CEREUS; scandens, minor, polygonus, articulatus. Par. Bat.* The lesser creeping, joynted Torch-Thistle, with many Angles.

12. *CEREUS; minimus, articulatus, polygonus, spinosus. Boerh. Ind.* The least prickly joynted Torch-Thistle with many Angles.

The first Sort is the hardiest, as also the most common in *England* of any of these Sorts, and may be preserv'd in a good Green-house without any artificial Heat, provided the Frost is kept intirely out, and the Plant kept very dry all the Winter, for Wet is the greatest Enemy to these Plants.

The 2d, 3d, 4th, 5th, 6th, 7th, and 8th Sorts are somewhat tenderer, and will require a little artificial Warmth in very bad Weather, therefore these should be plac'd in a Stove, which is kept up to the temperate Heat, mark'd on Mr. Fowler's Thermometers: This must also have very little Water in the Winter-season.

The 9th Sort is by the Inhabitants of *Barbadoes*, train'd up against their Houses, for the Sake of its Fruit, which is about the Bigness of a *Bergamot-Pear* and of a most delicious Flavour. This, with the 10th, 11th and 12th Sorts, are very tender, and require a very warm Stove to preserve them: These should be plac'd against the Walls of the Stove, into which they will insinuate their Roots, and extend themselves to a great Length, and with a little Help, in fastning them to the Wall here and there, may be led up about the Ceiling of the House, where they will appear very handsome. And the 11th Sort, when arriv'd to a sufficient Strength, will produce many exceeding large, beautiful, sweet-scented Flowers; but they are (like all the Flowers of these Kinds) of a very short Duration, scarcely continuing full blown twelve Hours; nor do the same Flowers ever open again, when once clos'd: These Flowers open in the Afternoon, and before the next Morning shut up again.

I don't remember to have heard of any of the other Sorts (except the first) which has produc'd Flowers in *Europe*; tho' it is to be hop'd, that when they are arriv'd to a sufficient Strength, they will flower as well as those two, but at present, the Plants of the other Sorts are but young, having been in *England* but a few Years. The first Sort seldom produces its Flowers until arriv'd to a considerable Age, unless by some Accident, which many times occasions their flowering sooner than they are commonly inclin'd to. Of this Kind, there was a very large Plant in the Royal Garden at *Paris*, which was upward of thirty Feet high, and had produc'd Flowers for several Years; but by the Severity of the late Winter (*Ann. 1728*) was destroy'd. There was also another in the *Physick Garden* at *Leyden*, which, in the Year 1727, when I was there, was above twenty Feet high, and had a great Number of Flowers upon it; but I don't know of any in *England* that are above twelve or fourteen Feet high, tho' there have been many flower'd within a few Years past.

These

These are all propagated by Cuttings, so that if you intend to increase the Number of them, you must cut off their Stems, at what Length you please: These should be laid by in a dry Place to heal, at least a Week or ten Days before they are planted; but if they lie a Fortnight or three Weeks it is much the better, and they will be in less Danger of miscarrying.

These Cuttings should be planted in small Pots, fill'd with light sandy Earth, with a Mixture of Lime-rubbish, laying some Stones in the Bottom of the Pots to drain off the Moisture; then place the Pots into a gentle Hot-bed of Tanner's-bark, to facilitate their rooting, giving them once a Week a gentle Watering.

The best Season for this Work is in June or July, that they may have time to root before Winter: Toward the Middle of August you must begin to give them Air by degrees, to harden them against Winter, but they should not be wholly expos'd to the open Air or Sun: At the End of September they must be remov'd into the Stove where they are to abide the Winter: during which Season, you must be very careful not to let them have much Water, and always observe to place the young Plants, for the first Winter, in a little warmer Situation than the older Plants, as being somewhat tenderer.

These Plants should always have a dry Situation in Winter; for as they imbibe the greatest Part of their Nourishment from the circumambient Air, so if this be too replete with moist Particles, it will occasion their rotting. These Plants should none of them be expos'd abroad, not even in the Midst of Summer, for great Rains, which often happen at that Season, are very injurious to them: The first eight Sorts should be therefore plac'd so as to enjoy a free Air in the Summer, but at the same time screen'd from Rains and great Dews; it will therefore be much the better Method to set them in an open Glass-stove, where the Windows may be set open in good Weather, and shut in cold or wet. The other four Sorts must not be expos'd too much to the open Air, even in the hottest Season, especially if you design to have them flower; and in Winter they should be kept very warm, and have no Water given them.

When you have once cut off the Tops of any of these Plants, in order to increase them, the Bottoms will put forth fresh Shoots from their Angles, which when grown to be eight or nine Inches long, may also be taken off to make fresh Plants, and by this means the old Plants will continually afford a Supply, so that you never need cut off above one Plant of a Sort, which you should preserve for a Breeder.

These Plants being succulent, they will bear to be a long time out of the Ground, therefore whoever hath a mind to get any of them from the *West-Indies*, need give no other Instructions to their Friends, but to cut them off, and let them lie two or three Days to dry; then put them up in a Box with dry Hay or Straw, to keep them from wounding each other with

their Spines; and if they are two or three Months on their Passage, they will keep very well, provided no Wet get to them.

CERINTHE; [*κεντήριον* of *κενή*, Gr. *Wax*; because the Bees in the Summer time, while they are making their Honey-combs, do from this Plant, of which they are great Lovers, extract a Juice wherewith they make their Wax.] Honey-wort.

The Characters are,

It hath glaucous deep-green Leaves, which are for the most part beset with Prickles: The Flowers are cylindrical, consisting of one Leaf, in Shape like those of Comfrey, and are pendulous; each Flower is succeeded by two oblong naked Seeds.

The Species are;

1. **CERINTHE**; *quorundam, major, versicolore flore.* J. B. The larger Honey-wort, with party-colour'd Flowers.

2. **CERINTHE**; *quorundam, major, spinosa folio, flavo flore.* J. B. The larger Honey-wort, with prickly Leaves and yellow Flowers.

3. **CERINTHE**; *quorundam, major, flore, ex rubro-purpurascete.* J. B. The large Honey-wort, with reddish purple Flowers.

4. **CERINTHE**; *quorundam, minor, flavo, flore.* J. B. The lesser Honey wort, with yellow Flowers.

5. **CERINTHE**; *folio non maculato, viridi.* C. B. Honey-wort, with deep-green Leaves, without Spots.

6. **CERINTHE**; *flore versicolore, ex albo & rubro.* Boerb. Ind. Honey-wort, with red and white party-colour'd Flowers.

7. **CERINTHE**; *flore versicolore ex albo & purpureo.* Boerb. Ind. Honey wort, with purple and white party-colour'd Flowers.

The several Varieties of this Plant are propagated by Seeds, which should be sown soon after they are ripe, for if they are kept till Spring, the growing Quality of them is often lost; the Plants are hardy, and if the Seeds are sown in a warm Situation, they will endure the Winter's Cold very well without covering: These *Autumnal* Plants also are much surer to produce ripe Seeds than those which were sown in the *Spring*, which are generally late in the Season before they flower, and consequently, if the *Autumn* should not prove very warm, their Seeds would not be perfected.

These Plants are pretty Varieties for large Borders in Gardens, where, if they are suffer'd to drop their Seeds, the Plants will arise without any farther Care; so that when a Person is once furnish'd with the several Varieties, he need be at no more Trouble than to allow each of them a respective Place, where it may remain, and sow its self: And with this Culture there is a greater Certainty of preserving the Sorts than in any other Management; nor will they perhaps be intirely lost in this Way, it it should happen, that the Season should prevent its maturing the Seed, (as it sometimes proves); for when great Quantities of the Seeds have scatter'd upon the Ground, some of them will be buried so deep, in stirring the Earth, as not to grow the first Year; which

—upon being turn'd up to the Air, the succeeding Year, will come up as well as new Seeds.

CETERACH; *vide* Asplenium.

CHÆROPHYLLUM; χαίρειλλον, of χαίρειν *to rejoice*; and φύλλον, Gr. a *Leaf*, because the Leaves being drank, do exhilarate and cheer melancholy Persons; it is also call'd *Cerfolium*, as though *Ceres's* Leaves, because this Plant serves the Table, where, in old Time, the Goddess *Ceres* did preside.

The Characters are;

It is an Umbelliferous Plant, whose Leaves are divided into many Segments; the Petals of the Flower are bifid, and heart-shap'd, and each Flower is succeeded by two long Seeds, which are not furrow'd.

The Species are;

1. CHÆROPHYLLUM; *fativum*. C. B. Garden or manur'd Chervil.

2. CHÆROPHYLLUM; *sylvestre*, *perenne*, *Cicutæ folio*. Tourn. Wild Perennial Chervil, or Cow weed.

The first of these Species is cultivated in the Kitchen-Garden for Sallads, &c. The Seeds of this Plant should be sown in Autumn, soon after it is ripe, or very early in the Spring, otherwise it very often miscarries; and as the Plant is annual, if it have a cool shady Spot of Ground allotted for it, and be suffer'd to sow its self, it will thrive better than when cultivated by Art.

The second Sort grows wild upon moist dry Banks and Hedge-sides near London.

CHAMÆCERASSUS; [of χαμαί, the Ground; and χέρσος, Gr. a *Cherry-Tree*; as if we should say, a *Dwarf-Cherry*.] Upright Honey-suckle; *vulg.*

The Characters are;

It is a Shrub growing upright to the Height of eight or nine Feet; whose Flowers consist of one Leaf, which open towards the Top like two Lips, somewhat after the manner of the Honey-suckle. These Flowers are succeeded by Berries somewhat like small Cherries; two of which are, for the most part, produc'd upon one Pedicle.

The Species are;

1. CHAMÆCERASSUS; *dumetorum*, *fructu gemino*, *rubro*. C. B. The upright Red-berried, or Fly-honeysuckle; *vulg.*

2. CHAMÆCERASSUS; *Alpina*, *fructu gemino*, *rubro*, *duobus punctis notato*. C. B. The greater upright Red-berried Honey-suckle.

3. CHAMÆCERASSUS; *montana*, *fructu singulari caeruleo*. C. B. The upright Blue-berried Honey-suckle.

These Shrubs are very proper Ornaments for Wilderness Quarters, to intermix with others which are nearly of the same Growth, where by the Diversity of their Leaves, and their regular Growth, they appear very well.

They are propagated by laying their tender Branches, which in one Year will have good Roots, and may be safely transplanted either into Nurseries, or where they are intended to remain. The best Season for this Work is in

the Spring, before they begin to shoot: They may also be increas'd by planting Cuttings in the Spring, in an East Border, where they may be defended from the great Heat of the Mid-day Sun, and carefully water'd in dry Weather: But these will scarcely have Roots fit to bear transplanting in less than two Years; and the Blue-berried kind is pretty difficult to take Root from Cuttings; therefore that should always be propagated by Layers, if possible; which in laying should be slit at the Joint, as is done in laying Carnations, which will greatly facilitate their striking out Roots.

There are some other Species of this Shrub in the curious Botanick Gardens abroad, particularly in that admirable Collection of Trees and Shrubs in the Garden of the learned Doctor Boerhaave, near Leyden in Holland, where, amongst a great Variety of other uncommon Trees (perhaps more than in any one Garden in Europe, and which have been all collected together at the sole Expence of the worthy Possessor) which that curious Gentleman was pleas'd to shew me, I observ'd two or three Sorts of this Tree which I had never before seen.

The first and second Sorts are of quicker Growth than the third, and will, in a few Years, rise to the Height of six or seven Feet; whereas the third seldom rises above four or five Feet high with us.

CHAMÆCISTUS; *vide* Helianthemum.

CHAMÆCLEMA; [of χαμαί *low*, and κλίμα *to climb*, i. e. *Dwarf-climber*;] or rather *Hedera Terrestris*, or Ground-Ivy.

The Characters are;

The Shoots trail upon the Ground, and emit Roots from almost every Joint, which fasten themselves into the Earth: The Leaves are roundish, thick, rough, and are crenated on the Edges: The Helmet of the Flower is roundish, bifid and reflex'd: The Beard (or lower Lip) is trifid, or cut into three Segments; the middle Segment is broad, and bifid; and the Flowers are produc'd at the Joints of the Shoots.

The Species are;

1. CHAMÆCLEMA; *vulgare*. Boerb. Ind. Common Ground-Ivy, or Gill-go-by-Ground.

2. CHAMÆCLEMA; *minus* Boerb. Ind. Lesser Ground-Ivy.

3. CHAMÆCLEMA; *vulgare*, *foliis profunde incis.* Common Ground-Ivy, with deep-cut Leaves.

4. CHAMÆCLEMA; *minus*, *foliis ex albo variegatis*. The lesser Ground-Ivy, with variegated Leaves.

The two first Sorts grow wild in most Parts of England, upon the Sides of Banks and Footways, and are promiscuously gather'd by the Herb-women, and brought to the Market for medicinal Uses. The third Sort is a Variety of the first, which for three or four Years held its Difference in the Physick-Garden. The fourth Sort is a Variety of the second, which constantly continues, if it be not planted in too rich a Soil: This is a pretty Variety amongst other variegated Plants, and increases fast enough by its trailing Branches.

CHAMÆ.

CHAMÆCYPARISUS; *vide* Santolina.

CHAMÆDAPHNE; *vide* Ruscus.

CHAMÆDRYS; [*χαμαδρύς*, of *χαμὰι* Dwarf, and *δρύς* an Oak, i. e. Dwarf-Oak.]
Germander.

The Characters are;

It hath small thick Leaves, which are laciniated somewhat like those of the Oak: The Flowers (which are produced at the Wings of the Leaves) are labiated: The Stamina or Threads supply the Place of the Crest, or Upper-Lip: The Beard or Lower-Lip of the Flower is divided into five Parts; the middle Segment (which is largest) is hollow like a Spoon, and sometimes divided into two Parts: The Cup of the Flower is fistulous.

The Species are;

1. CHAMÆDRYS; *major repens*. C. B. The Greater Creeping Germander.
2. CHAMÆDRYS; *minor, repens*. C. B. The smaller Creeping Germander.
3. CHAMÆDRYS; *laciniatis foliis*. Lob. Germander with Cut Leaves.
4. CHAMÆDRYS; *Hispanica, tenuifolia, multiflora*. H. R. Par. Narrow-leav'd Spanish Germander, with many Flowers.
5. CHAMÆDRYS; *Alpina frutescens, folio splendente*. Tourn. Shrubby Germander of the Alps, with shining Leaves.
6. CHAMÆDRYS; *fruticosa, Cretica, purpureo flore*. Tourn. Shrubby Germander of Crete, with a purple Flower.
7. CHAMÆDRYS; *multifida, spinosa, odorata*, Vir. Lusit. Prickly Sweet-smelling Germander, with Leaves divided into many Parts.

There are several other Varieties of this Plant, which are preserv'd in the curious Gardens of Plants Abroad; but these mention'd are the principal Sorts to be found in the English Gardens. These may be propagated, by sowing their Seeds in the Spring in a Bed of fresh Earth in an open Situation; and when the Plants are come up, they may be transplanted either into small Pots, or in Borders where they are intended to remain.

The fourth, fifth, sixth, and seventh Sorts should have the Shelter of a Wall, Hedge, or Pale to protect them from the North and East Winds, which are sometimes destructive to them, if too much expos'd thereto. These Sorts may also be increas'd, by planting their Cuttings in a shady Border, in May or June; which, if supply'd with Water in dry Weather, will take Root very well in about three Months time, when they may be remov'd with Safety where they are design'd.

The third Sort is a biennial Plant, rarely abiding after it hath perfected its Seeds: This should be sown in a Border which is screen'd from the cold Winds; and when the Plants are come up, they may be transplanted to a greater Distance in the same well-shelter'd Border; and the Spring following, the Plants will flower, and soon after will perfect their Seeds; which, if permitted to scatter upon the Ground, will arise of themselves, without any

more Trouble, and need only to be transplanted where the Plants are intended to remain.

The first and second Sorts are very hardy, and propagate themselves very fast by their Creeping roots, which if suffer'd to spread, as they are naturally inclin'd, will in a short Time cover a large Spot of Ground: Therefore they should be planted at a good Distance, and remov'd every Spring or Autumn, to prevent their over-running the Ground.

The second Sort is prescrib'd in the last College Dispensatory: But the first is our common Sort in England, which is what the Markets are supply'd withal; the second being to be found only in curious Gardens of Plants.

CHAMÆLEA; *vide* Thymelea.

CHAMÆLÆA; [*χαμαλαῖα*, of *χαμὰι* low, and *ἔλαια* an Olive-Tree, as tho' the low Olive-Tree, because this Plant resembles that Tree. It is also call'd *Chamælæa Tricoccus*, because it bears three Seeds joyn'd together.] Widow-Wail.

The Characters are;

It hath a Flower consisting of one Leaf, which is deeply divided into three Parts: The Cup of the Flower is also of one Leaf, divided into three Segments: The Fruit consists of three hard Berries closely joyn'd together, in each of which is contain'd one oblong Seed: To which may be add'd, It hath the Appearance of a Shrub, and the Leaves are small and oblong.

There is but one Species of this Plant in the English Gardens, which is,

CHAMÆLÆA; *tricoccus*. C. B. The Widow-Wail.

This is a Shrub of low Growth, seldom arising above two or three Feet in Height with us, and is somewhat tender; therefore should (if planted abroad) have a warm Position, and a dry Soil: It is usually preserv'd in Green-houses in the Winter; but I find it will endure the Cold of our common Winters in the open Ground, if defended from the cold Winds.

This Plant is propagated by sowing the Seeds, soon after they are ripe, in a Pot or Tub of Earth, which should be shelter'd from Frosts in Winter, and the Earth suffer'd to remain undisturb'd till the second Year, when the Seeds will arise; which to promote, if you place the Pot into a gentle Hot-Bed, it will greatly forward the Growth of the Plants. When the Plants are come up about six or eight Inches high, they may be transplanted singly into small Pots, and screen'd from the Sun until they have taken fresh Root: After which Time they should be expos'd to the open Air; but for the two first Winters, while young, should be shelter'd under a common Hot-bed Frame: But afterwards they may be turn'd out of the Pots into the full Ground, under a Wall, &c. (as was before directed) where they will abide very well. This Plant hath no great Beauty; nor do I know any Use made of it in England; and is only preserv'd in curious Collections of Plants, for Variety-sake.

CHAMÆ.

CHAMÆMELUM, [*Καμμήλον*, of *Καμά* and *Μήλον* an Apple; so call'd, because it has the Scent of an Apple.] Camomile.

The Characters are;

It hath a fibrose Root: The Cup of the Flower is squamose, which expands and appears like many Leaves: The Flowers are for the most part radiated: The Petals of the Flower are white, and the Disk yellow: The Leaves are cut into five Segments.

The Species are;

1. **CHAMÆMELUM**; *odoratissimum, repens, flore simplici*. *J. B.* Sweet-scented creeping Camomile.

2. **CHAMÆMELUM**; *repens, odoratissimum, perenne, flore multiplici*. *J. B.* Sweet-scented creeping Camomile, with double Flowers.

3. **CHAMÆMELUM**; *vulgare, amarum*. *J. B.* Common Bitter Camomile.

4. **CHAMÆMELUM**; *fatidum*. *C. B.* Stinking Camomile, or May-weed.

5. **CHAMÆMELUM**; *majus, folio tenuissimo, caule rubente*. *H. R. Par.* Larger Camomile, with narrow cut Leaves and reddish Stalks.

6. **CHAMÆMELUM**; *leucanthemum, Hispanicum, magno flore*. *C. B.* Spanish Camomile, with large Flowers.

7. **CHAMÆMELUM**; *Chium, verum, folio crassiori, flore magno*. *T. Cor.* Spring Thick-leav'd Camomile of *Chio*; with large Flowers.

8. **CHAMÆMELUM**; *Orientele, incanum, folio millefolii*. *T. Cor.* Eastern Camomile, with hoary yarrow Leaves.

9. **CHAMÆMELUM**; *Lusitanicum, latifolium, sive Coronopi folio*. *Breyn.* Broad-leav'd Portugal Camomile.

10. **CHAMÆMELUM**; *Æthiopicum, lanuginosum, flore albo*. *Breyn.* Ethiopian woolly Camomile, with a white Flower.

11. **CHAMÆMELUM**; *Æthiopicum, lanuginosum, flore luteo*. *Boerb. Ind.* Ethiopian woolly Camomile, with a yellow Flower.

12. **CHAMÆMELUM**; *Orientele, foliis pinnatis*. *T. Cor.* Eastern Camomile, with pennated Leaves.

There are several other Varieties of this Plant which are kept in curious Botanick Gardens, but these here mention'd are the principal Sorts we have at present in the English Gardens.

The first Sort is the common Camomile of the Shops, and is the only Kind which is propagated for Use in the English Gardens: This was formerly in great Request for making of green Walks; but as it is very subject to rot in Winter, especially when grown pretty thick, whereby the Walks planted therewith will have many bare Patches, and are thereby render'd very unsightly, it hath occasion'd the Disuse of it for those Purposes of late Years; but it is still cultivated in Physick Gardens for medicinal Use, though it grows wild in great Plenty on most of the large Commons or Heaths near London.

The second Sort is preserv'd in Gardens for the Variety of its very double Flowers, but is not so good for medicinal Uses as the common, tho' at present it is more generally us'd.

There is also another Variety of this Plant, which is sometimes found wild amongst the

common, that hath naked Flowers, being intirely destitute of Petals, or Flower-leaves.

These three Sorts are easily propagated in a Garden, by parting their Roots, and planting them about eight or ten Inches distant every Way, for they are great Spreaders, especially when planted in a good Soil. The best Season for this Work is in March: They all thrive best in a poor Soil.

The third, fourth, and fifth Sorts are common Plants, in most Parts of England, and are rarely preserv'd in Gardens, unless it be in publick Botanick Gardens, to increase the Number of Varieties.

The other Sorts, tho' Strangers in our Climate, yet will do very well if sown in the Spring of the Year in an open Bed of fresh Earth, (except the tenth and eleventh Sorts, which are somewhat tender, and should be first rais'd in a moderate Hot-bed, and may afterwards be transplanted abroad, where they will flower, and ripen their Seeds very well): They are most of them Annuals, therefore should either be sown every Spring, or their Seeds suffer'd to sow themselves, whereby the Labour may be sav'd of preserving their Seeds; and the Plants which arise from their Seeds in Autumn, if they stand the Winter, will flower early the succeeding Summer, and perfect their Seeds better than if sown in the Spring.

These Varieties are very proper for all curious Collections of Plants, but are seldom preserv'd in Gardens for Use or Pleasure.

CHAMÆMESPIBUS; *vide Mespilus.*

CHAMÆMORUS; [*of Καμά and Morum, Lat. a Mulberry.*] Cloud-Berries, or Knot-Berries.

The Characters are;

It hath a pentapetalous Flower: The Fruit is compos'd of many Acini, in Form of the Mulberry.

There is but one Species of this Plant known in England, which is,

CHAMÆMORUS. *Clus. Hist.* Cloud-Berries; *vulgô.*

This Plant is found upon the Tops of the highest Hills in the North-part of England; but can't be cultivated in a Garden by any Art.

CHAMÆNERION; of *Χαμαί* Dwarf, and *Νήπιον* a Rose Bay. Gesner calls this Plant *Filius ante Patrem*, i. e. the Son before the Father; because, as it is well known, in other Plants the Flower is always prior to the Ovary: But this Fruit alway appears before the Flower; but yet it is not before the Flower; for the Tube of the Ovary equally strikes among the Stamina of the Flower, and hence are equally foecundated, as in other Plants.

The Characters are;

The Calyx of the Flower consists of four Leaves, which are long, slender, and are expanded: The Flowers are rosaceous, and consist of four Leaves, which are succeeded by long square Cods, which, when ripe, open into four Cells; in each of which are contain'd many downy Seeds.

The

The Species are ;

1. CHAMÆNERION ; *villosum, magno flore purpureo*. Tourn. Great hairy coddled Lole-strife, or Willow-Herb ; called also Codlings and Cream.

2. CHAMÆNERION ; *latifolium, vulgare*. Tourn. Broad-leav'd Willow-Herb, or Rosebay, commonly called French Willow.

3. CHAMÆNERION ; *latifolium, vulgare, flore albo*. Tourn. Broad-leav'd Willow Herb, or Rosebay, with white Flowers.

The first Sort is found very common by the Sides of Ditches in most Parts of England ; but notwithstanding its Commonness, may be admitted into a large Garden, especially if there happens to be a moist Place where few other Things will thrive, here this Plant will produce fair Flowers for two Months successively.

The other two Sorts afford fine Spikes of beautiful Flowers, and deserve a Place in some remote Corner of the Garden, for the Use of their Flowers to furnish Basons for Halls, Parlours, &c. but must not be planted amongst other Flowers, for their Roots spread very far under the Surface of the Ground, and would thereby soon over-run and destroy whatever Flowers grew near them ; nor should they be permitted to ripen their Seeds, which will spread all over the Garden, and become very bad Weeds ; the Stalks therefore should be cut down before the Seeds are spread abroad by the Wind.

These Sorts multiply fast enough by Off-sets, which may be planted either in Spring or Autumn, in any shady Part of the Garden, where they will thrive in almost any Soil, but best in that which is moist.

There are several other Varieties of this Plant, many of which are found wild in England, which are unworthy of a good Garden, therefore I shall omit mentioning them in this Place.

CHAMÆPITYS ; *Χαμαίπυς, of χαμαί and πύς a Pine-tree, q. d. Humble Pine, because the Leaves of this Plant resemble the Pine.* Ground-Pine.

The Characters are ;

The Leaves are narrow and trifid ; the Flower is lobiated ; the Place of the Galea or Crest of the Flower is supplied with little Teeth ; the Beard (or lower Lip) is divided into three Parts, the middle Segment being again split into two Parts ; the Flowers rarely grow in Whorles, (as doth most of this Tribe of Plants,) but one or two Flowers are produc'd at the Wings of the Leaves.

The Species are ;

1. CHAMÆPITYS ; *lutca, vulgaris, five folio trifido*. C. B. Common yellow Ground-Pine.

2. CHAMÆPITYS ; *moschata, foliis, serratis, an prima Dioscoridis*. C. B. Musk Ground-Pine, with ferrated Leaves.

There are several other Varieties of these Plants mention'd in Foreign Catalogues, but these two Sorts are all that I have seen growing in England.

The first Sort is found growing wild upon chalky Lands in many Parts of England : This

may be cultivated in a Garden, if the Seeds are sown soon after they are ripe, for if it be kept till Spring it seldom rises well ; and if it doth come up, the Seeds are seldom perfected by Spring-Plants. This Sort is used in Medicine.

The second Sort is preserv'd in curious Gardens of Plants, but is seldom to be found in Pleasure-Gardens, it being a Plant of no great Beauty : This is also an Annual, and may be cultivated in the same manner with the former ; they both thrive best in a dry undung'd Soil.

CHAMÆRIPHES ; *vide Palma*.

CHAMÆRUBUS ; *vide Rubus*.

CHAMÆSYCE ; *vide Tithymalus*.

CHELIDONIUM Minus ; [of *Nemesis*, Gr. a Swallow : The Poets having feign'd concerning this Plant, that it takes its Name from the Use which Swallows make of it ; for they tell us, that Swallows apply the Leaves of *Chelidony* to the Eyes of their young ones which are hatch'd blind, and by that means open them : But 'tis certain from Natural History, that the Eyes of all young Birds, when they are first excluded the Shell, have their Eyes cover'd with a Sort of a thin Membrane, as it is after some sort in a human *Fœtus*, because the Humours are not sufficiently clear and pellucid, but turbid.] Pilewort, or lesser Celandine.

The Characters are ;

It hath a grumose or granulose Root ; the Leaves are roundish ; the Flower-stalks trail upon the Ground ; the Cup of the Flower consists of three Leaves ; the Flowers are rosaceous, consisting of five or more Leaves ; the Ovary becomes a globular Fruit, after the manner of the Ranunculus.

The Species are ;

1. CHELIDONIUM ; *minus. Dod.* The lesser Celandine or Pilewort.

2. CHELIDONIUM ; *minus, flore pleno. Camer.* The lesser Celandine, with double Flowers.

The first Sort grows wild by the Sides of Ditches and in moist Meadows in almost every Part of England, so that 'tis rarely kept in a Garden.

The second Sort is a Variety of the first, which hath been found in the Meadows, and transplanted into several curious Gardens, where it continues to produce very double Flowers, and is, for Variety, worthy of a moist shady Border in the best Gardens : They both propagate themselves by Roots very fast, so that there needs no more Care with them than the first transplanting some Roots of the Sort you would preserve into some shady moist Spot of Ground, letting them remain undisturb'd, and in a short time they will furnish a sufficient Supply of Roots.

CHELIDONIUM Majus ; The greater Celandine.

The Characters are ;

The Cup of the Flower consists of two Leaves, which soon fall away : The Flower hath four Leaves,

Leaves, which are expanded in Form of a Cross: The Ovary in the Base of the Flower, is surrounded by many Stamina (or Threads): The Flowers soon fall away, and are succeeded by many bivalve Pods, which contain many small round Seeds: And the whole Plant is full of a yellow bot Juice.

The Species are;

1. CHELIDONIUM; *majus, vulgare*. C. B. Common Great Celandine.

2. CHELIDONIUM; *majus, foliis quernis, flore laciniato*. Mor. Hist. Greater Celandine, with Leaves like the Oak, and lacinated Flowers.

3. CHELIDONIUM; *majus, foliis & flore minutissimè laciniatis*. H. R. Par. Greater Celandine, with fine cut Leaves and Flowers.

4. CHELIDONIUM; *maximum, Canadense, acaulon*. Corn. Large Canada Celandine without Stalks.

The first Sort grows wild upon dry Banks and Walls in most Parts of England, and is brought to the Markets by the Herb-women, who gather it for Medicinal Use.

The second Sort hath been found wild in some particular Places in England, particularly at *Wimbleton* in *Surrey*: This Sort constantly retains its Difference when cultivated in a Garden, and sown yearly; the Seeds of this never producing any Plants of the common Sort amongst them.

The third Sort is only to be found in curious Botanick Gardens, where it is preserv'd for its Variety.

The fourth Sort was brought from *America*; and altho' stiled *Canada* in its Title, yet is found in divers Parts of the Continent, as in *Virginia*, *Carolina*, *New England*, &c. from whence I have received Plants of this Kind, which I find will endure our severest Winters in the open Ground, if planted near a Wall, Pale, &c. to defend it from the cold Winds. This flowers in *April*, and perfects its Seeds in *June*; from which new Plants may be obtain'd, if sown soon after it is ripe: But the easiest Method to propagate this Plant, is by parting the Roots in *March*, which increase very fast in a dry Soil.

The other Varieties may all be propagated by sowing their Seeds soon after they are ripe, in any Corner of the Garden; where, if suffer'd to cast their Seeds, they will always furnish a plentiful Stock of young Plants, without any farther Trouble.

CHELONE, [*Χελών*, Gr. a Tortoise.]

The Characters are;

It hath a short, green, squamose Calyx: The Flower consists of one Leaf, which is divided into two Lips: The Galea (or Crest) is somewhat like the Head of a Tortoise: The Beard (or lower Lip) is extended beyond the Crest, and is bifid: The Flower is succeeded by a Fruit which is in Shape like that of the Fox-glove, and is divided into two Cells, in which are contain'd many flat Seeds that are furrow'd on the Edges.

There is but one Species of this Plant at present known in the English Gardens, which is,

CHELONE; *Acadiensis, flore albo*. Tourne. White flowering Chelone of Acadia.

Though, by the Title of this Plant, it is suppos'd a Native of *Acadia* only, yet hath it been brought from divers Parts of *America*; and 'tis very probable may be found in most Parts of *North America*, as *Virginia*, *Maryland*, *New England*, &c. From the two last mentioned Places several Plants have been sent to *England* by some curious Persons of those Countries.

This Plant is very hardy, enduring our severest Cold in the open Ground: It is propagated by parting the Roots in the Spring, which increase very fast under the Surface of the Earth; therefore it should not be planted amongst other curious Plants or Flowers, lest, by its spreading Roots, it should overbear and destroy them. It dies to the Surface every Winter, and arises again the succeeding Spring, producing its Flowers in *August*, and ripens its Seeds in *October*; which altho' it seems to be perfectly good almost every Year, yet I could never procure one single Plant from all the Seeds I have yet sown, either of my own sowing, or such as have been brought from Abroad.

CHENOPODIO MORUS, [*Χηνοπώδιον*, of *χλω* *χλω* of a Goose, and *πός* a Foot, Gr. and *Morus* a Mulberry: because the Leaves resemble a Goose Foot; and the Fruit, that of a Mulberry.] Mulberry Blight.

The Characters are;

The whole Plant hath the Appearance of a Blight; but the Fruit is succulent, and in Shape like a Mulberry or Strawberry.

The Species are;

1. CHENOPODIO MORUS; *major*. Boerb. Ind. Great Mulberry Blight, commonly call'd Strawberry Spinage.

2. CHENOPODIO MORUS; *minor*. Boerb. Ind. Lesser Mulberry Blight, commonly call'd Berry-bearing Orach.

These two Plants are pretty Varieties in a Garden, being very proper to plant in Pots, to intermix with other Annual Plants to adorn Court-yards, during the Summer and Autumn Seasons; where (if the Plants are regularly train'd up to Sticks while young) their Fruit, with which every part of the Plant will be fill'd, doth make a very good Appearance.

These Plants are propagated by sowing their Seeds in the Spring in a gentle Hot-bed; and when the Plants are strong enough to be transplanted, they may be planted in Pots of rich Earth, and expos'd to the open Air, giving them frequent Waterings, as the Season may require; and as they advance in Height, they should be kept ty'd up close to Sticks trimming off all the Side-branches; which, if permitted to remain on, would prevent the Plant from advancing in Height.

The Fruit of these Plants, if suffered to fall to the Ground, will come up again in the Autumn; which Plants, if potted, and shelter'd from severe Frosts, in a common Hot-bed Frame, will grow much larger than those sown in

in the Spring, and flower and produce their Fruit much earlier in the Season : So that, by having Plants of both Seasons, they may be continued in Beauty through the greatest Part of the Summer and Autumn.

CHENOPODIUM, [*Xlaurodidior*, Gr.] Goose-foot, or Wild Orach.

The Characters are ;

The Seeds are single and globose in some Species, but in others they are compress'd : The Cup of the Flower is quinquefid (or divided into five Parts) : The Leaves grow alternately upon the Stalks between the Seeds.

The Species are ;

1. **CHENOPODIUM** ; *fatidum*. Tourn. Stink-ing Orach.

2. **CHENOPODIUM** ; *Lini folio, villoso*. Tourn. Flax-leav'd Orach, commonly call'd Summer-Cypress, or Belvedere.

3. **CHENOPODIUM** ; *Ambrosioides, folio sinuato*. Tourn. Cut-leav'd Orach, commonly call'd Oak of Jerusalem.

4. **CHENOPODIUM** ; *Ambrosioides, Mexicanum*. Tourn. Mexican Orach, commonly call'd Oak of Cappadocia.

4. **CHENOPODIUM** ; *Ambrosioides, Mexicanum fruticosum*. Boerb. Ind. Shrubby Mexican Orach.

The first of these Sorts is very common upon Dunghills, and in Gardens, in most Parts of England : It is seldom cultivated, except in some Physick Gardens ; for the Markets in London are supplied with it by the Herb-women, who gather it wild.

The second Sort is sometimes cultivated in Gardens ; 'tis a beautiful Plant, which naturally is dispos'd to grow very close and thick, and in as regular a Pyramid as if cut by Art. The Leaves are of a pleasant Green : And were it not for that, it hath so much of the Appearance of a Cypress Tree, that at some Distance it might be taken for the same, by good Judges. The Seeds should be sown in Autumn : And in the Spring, when the Plants are come up, they may be planted into Pots of good Earth, and kept supplied with Water, in dry Weather : These Pots may be intermix'd with other Plants, to adorn Court yards, &c. where they will appear very handsome, until their Seeds begin to swell and grow heavy, which weigh down and displace the Branches : At which Time the Pots should be remov'd to some abject Part of the Garden, to mature their Seeds ; which, if permitted to fall upon the Ground, will come up the next Spring : So that you need be at no more Trouble in propagating these Plants, but only to transplant them where you intend they should grow.

The third Sort was formerly used in Medicine : But altho' it still continues in the Catalogue of Simples annex'd to the London Dispensatory, yet is very seldom us'd at present. This Plant may be propagated by sowing the Seeds in an open Border of good Earth in the Spring, where it will perfect its Seed in Autumn ; which, if permitted to shed upon the Ground, will arise as the former.

The fourth and fifth Sorts were brought from America, where the Seeds are call'd *Worm Seed* ; I suppose, from some Quality contain'd in it, which destroys Worms in the Body.

The fourth Sort is propagated by sowing the Seeds in the Spring (as the before-mention'd Sorts) ; and will perfect its Seed in Autumn ; after which, the Plant decays to the Ground : But if the Root be preserv'd in Shelter under a Hot-bed Frame, it will put forth again in the succeeding Spring.

The fifth Sort grows to be a small Shrub, arising sometimes to the Height of five or six Feet, and becomes Woody. This may be propagated by planting Cuttings in a shady Border during any of the Summer Months ; which should be shaded until they have taken Root, and that will be in a Month's Time, or less : Then they should be planted into Pots, that they may be shelter'd in the Winter under a Frame, where they will abide the Cold very well, being somewhat hardy, tho' they will not stand in the open Air. There is no great Beauty in these two Plants ; but they are preserv'd in Gardens, because of the strong Smell of their Leaves.

CHERRY-LAUREL ; *vide* *Lauro Cerasus*.

CHERRY-TREE ; *vide* *Cerasus*.

CHERVIL ; *vide* *Chærefolium*.

CHESNUT ; *vide* *Castanea*.

CHIVES, are the fine Threads of Flowers, or the little Knobs which grow on the Tops of these Threads.

CHIVES *Tipt with Pendants*, are the Apices of Flowers, having *Farina* hanging and shaking at their Points, as the *Tulip*, &c.

CHIVETS, are the small Parts at the Roots of Plants, by which they are propagated.

CHONDRILLA ; [of *Xondrion*, Gr. a *Cartilage*.] Gum-Succory.

The Characters are ;

It hath a cylindrical Cup to the Flower, which is cut almost to the Bottom, (in several Species :) The Seeds are oblong and narrow ; in other respects it is like the Lettice.

The Species are ;

1. **CHONDRILLA** ; *cærulea, altera, cichorei Sylvestris folio*. C. B. Blue-flower'd Gum-Succory.

2. **CHONDRILLA** ; *cærulea, laciniata, latifolia*. C. B. Blue-flower'd Gum-Succory, with broad cut Leaves.

3. **CHONDRILLA** ; *junceæ, viscosa, arvensis, quæ prima Dioscoridis*. C. B. Clammy Gum-Succory, with Shoots like the Rush.

4. **CHONDRILLA** ; *bieracii folio annua*. Tourn. The Annual Gum-Succory, with Hawkweed Leaves.

There are several other Varieties of this Plant, which are preserv'd in curious Botanick Gardens, for the sake of Variety : But as there is

is very little Beauty in them, so they are hardly worth their standing in a Pleasure-Garden.

But whoever hath a Mind to propagate their several Species, may sow their Seeds in an open Bed of common Earth in the Spring, where they will readily come up and thrive exceedingly, and their Seeds being permitted to scatter upon the Ground, will come up and soon overspread a Garden.

The three first Sorts are abiding Plants, and increase very much by their spreading Roots, which, if not confin'd, will in a short Time become very troublesome Weeds in a Garden; as also if their Seeds are suffer'd to ripen, they will be blown all over the Garden, and be full as bad as Sow-thistles.

CHRISTMAS-FLOWER; or Black Hel-lebore; *vide* Helleborus.

CHRISTOPHORIANA; [This Herb takes its Name of St. Christopher.] Herb-Christopher.

The Characters are;

The Flower consists of five Leaves, which are plac'd orbicularly, and expand in Form of a Rose; in the Center of which arises the Ovary, which becomes a soft Fruit or Berry, of an oval Shape, and is fill'd with Seeds in a double Row, which for the most Part adhere together.

The Species are;

1. **CHRISTOPHORIANA**; *vulgaris, nostras, racemosa & ramosa*. Mor. Hist. Common Herb-Christopher, or Bane-berries.

2. **CHRISTOPHORIANA**; *Americana, racemosa, baccis rubris*. Mor. Hist. American Herb-Christopher, with Red Berries.

3. **CHRISTOPHORIANA**; *Americana racemosa, baccis rubris, longo pediculo insidentibus*. Sarrac. American Herb Christopher, with Red Berries growing on long Footstalks.

The first of these Sorts is found in divers Places in Yorkshire, Cumberland, Northumberland, and other Northern Counties of England, but is rarely met with in the Southern Parts, unless where it is preserved in Gardens: This Plant may be propagated by sowing the Seeds, or parting the Roots: It must have a shady moist Situation, where it will thrive very well.

The second and third Sorts are only preserv'd in curious Gardens of Plants, and are rarely met with in the English Gardens; they are very hardy, and will endure our Cold very well if planted in the open Ground.

These are propagated in the same manner as the former.

CHRYSANTHEMOIDES OSTEOSPERMON; [of χρυσανθέμιον of χρυσος Gold, and σπέρμα a Flower, and εἶδος Form, Gr. It is call'd Osteospermon, of ὀστέον a Bone, and σπέρμα Seed, on account of the Hardness of its Seed.] Hard-seeded Chrysanthemum.

The Characters are;

The Leaves grow alternately upon the Branches: The Cup of the Flower is, for the most part, single and scaly: The Flowers are

radiated like a small Sun-Flower: The Ovary becomes a hard Seed.

The Species are;

1. **CHRYSANTHEMOIDES**; *Osteospermon; Africanum, odoratum; spinosum & viscosum*. H. A. African Sweet-scented, Hard-seeded Chrysanthemum, with prickly Branches and viscous Leaves.

2. **CHRYSANTHEMOIDES**; *Osteospermon, Africanum, arboreum; foliis populi albae*. Boerb. Ind. African Hard-seeded Tree-Chrysanthemum, with Leaves like the White Poplar.

3. *An.* **CHRYSANTHEMOIDES**; *quod Chrysanthemum ex insulis Caribæis leucois incanis & sericeis foliis; argenteis, crassis*. Pluk. Boerb. Ind. Hard-seeded Chrysanthemum from the Caribbe Islands, with thick whitish Leaves.

4. *An.* **CHRYSANTHEMOIDES**; *quod Chrysanthemum, Bermudense leucois foliis, virentibus crassis*. Pluk. Hard-seeded Chrysanthemum from Bermudas, with thick green Leaves.

5. *An.* **CHRYSANTHEMOIDES**; *quod Chrysanthemum Americanum foliis virentibus crassis & dentatis*. American Hard-seeded Chrysanthemum, with thick deep green Leaves indented on the Edges.

These Plants are all of them propagated by planting their Cuttings in a Bed of rich Earth in any of the Summer Months, observing to screen them from the Heat of the Sun until they have taken Root, which will be in about six Weeks or two Months after planting; at which Time they should be transplanted into Pots fill'd with light sandy Earth, and set in a shady Place until their Roots are fix'd to the new Earth; then they may be expos'd to the open Air till October, at which Time they should be hous'd, with Oranges, Myrtles, &c. giving them as much free Air in mild Weather as is possible, by opening the Windows of the Green-house, and observing to refresh them pretty often, for they all require in mild Weather much Water.

The three first mention'd Sorts are very hardy, and will endure to stand in a cold Green-house, with Myrtles and Anomum Plum's; where if they are only protected from freezing it will be sufficient: But the two last mentioned having very succulent Branches, must have a warmer Position; for upon the least Frost touching their Branches, they are very apt to rot and decay.

These Plants continue flowering the most Part of the Winter Season, which renders them valuable, because at that Time we have few other Plants which produce Flowers; and although these Flowers are not very beautiful, yet at that Season every Thing which appears like a Flower is acceptable, as putting us in Hopes of a succeeding Spring, when almost every Thing without Doors is depriv'd of its former Verdure and Beauty.

CHRYSANTHEMUM; [χρυσανθέμιον, Gr. from χρυσος Gold, and ἀνθήμιον a Flower; which is to say, Golden Flower.] Corn Marygold.

The Characters are,

It hath an annual Root; The Cup of the Flower is hemispherical, and scaly: The Flowers are

are radiated; the Rays being for the most part of a yellow Colour, and the Seeds are furrow'd.

The Species are ;

1. CHRYSANTHEMUM ; *flore partim candido, partim luteo*. C. B. White Corn-Marygold, or Chrysanthemum.

2. CHRYSANTHEMUM ; *folio matricariae, flore albo pleno*. H. C. The double White Chrysanthemum, or Corn-Marygold.

3. CHRYSANTHEMUM ; *Creticum, luteum*. H. Eyst. The Yellow Chrysanthemum, or Corn-Marygold.

4. CHRYSANTHEMUM ; *folio matricariae, flore luteo pleno*. Boerb. Ind. The double Yellow Chrysanthemum, or Corn-Marygold.

5. CHRYSANTHEMUM ; *Creticum, petalis florum fistulosis*. Tourn. The Quill-leav'd Chrysanthemum, or Corn-Marygold.

There are several other Varieties of this Plant ; but as they are of less Note than these mention'd, and only preserv'd in curious Botanical Gardens for their Variety, so I shall omit mentioning them in this Place.

These Plants are all propagated by sowing their Seeds in the Spring upon a gentle Hot-bed, in order to have them early, otherwise they will come up as well if sown in the open Ground : When the Plants are come up, they should be transplanted into Nursery-beds, at about ten Inches asunder every way, where they may remain until they shew their Flowers ; at which Time you may transplant all those which have double Flowers, either into Pots or Borders, to adorn the Pleasure-Garden or Court-Yard. The single ones may be pull'd up first, and cast away as good for nothing, which will make Room for the better, taking up the double ones, with a large Ball of Earth to their Roots, otherwise they will not bear removing when so far advanc'd. If these Plants are set in the full Ground, they will grow very large, therefore they should be planted only in very large Borders, and not too near other Flowers, lest by their over-bearing them they should be destroy'd : But they are much handiomer when confin'd in Pots, provided they are constantly water'd ; for by this Means their Roots are kept within Compass, and the Plants seldom grow so large, but produce a greater Quantity of Flowers.

In saving the Seeds of these Plants, you should always make choice of the very double Flowers, which will certainly produce a much greater Quantity of double Flowers the next Year, than would the Seeds of single or half double Flowers ; tho' if the Seeds are taken from the very best Flowers, they will degenerate, and bring some single Flowers amongst them : Therefore, to avoid this Disappointment, the better Method is, when you have gotten some fine double Kinds of these Plants of both Colours, to take off some Cuttings of each Kind towards the latter End of August or the Beginning of September, and plant them pretty close, in Pots fill'd with common fresh Earth, setting them in a shady Place, and observing to water them frequently : These Cuttings will, in a Month's time, strike out Roots,

and begin to grow ; you must therefore remove the Pots into an open Situation, observing, as before, to refresh them with Water, (which must now be done gently, that the young Plants may not grow too vigorous before Winter) : In this Place they may remain until the latter End of October, when you should place the Pots into a common Hot-bed Frame, that they may be screen'd from severe Frosts, which would destroy them ; but observe to take the Glasses off every Day, when the Weather will permit, otherwise the Plants will draw up and be very tender, so that upon the least Impression of Cold they will suffer very much ; as also by being shut up close, they would be subject to rot by the damp Air which surrounds them.

In the Spring these Plants may be transplanted out either into separate Pots or Borders, as before directed, where they will flower early, and hereby you will be sure to have the Sorts right, according to the Plants which the Cuttings were taken from.

CHRYSOSPLENIUM ; [*χρυσόσπληνον*, of *χρυσός* Gold, and *σπλήν* the Spleen, q. d. a Plant, the Flowers of which are of a golden Colour, and good against Diseases of the Spleen.] Golden Saxifrage

The Characters are ;

It hath a perennial fibrose Root : The Calyx (or Flower-cup) is divided into four Parts : The Flower hath no visible Petals, but hath eight Stamina, or Threads, which surround the Ovary : The Pointal becomes a membranous Vessel, which is forked and bivalve, inclosing many small Seeds.

The Species are ;

1. CHRYSOSPLENIUM ; *foliis amplioribus, auriculatis*. Tourn. Golden Saxifrage, with large-ear'd Leaves.

2. CHRYSOSPLENIUM ; *foliis pediculis oblongis insidentibus*. Raii Syn. Golden Saxifrage, with Leaves standing on long Footstalks.

These two Plants are found growing wild in many Parts of England, upon marshy Soils and Bogs, as also in moist shady Woods, and are seldom propagated in Gardens ; where, if any Person have Curiosity to cultivate them, they must be planted in very moist shady Places, otherwise they will not thrive.

CIBOULS, or CHIBOULS ; These are also cultivated by parting their Roots in Autumn, as was directed for Escallions, and to which they are nearly allied ; but the great Diversities of these Kinds, which were formerly cultivated in Kitchen-Gardens, are now almost wholly neglected, it being found to little Purpose the propagating so many Kinds, when two or three will answer all the Purposes full as well.

CICER ; [This Plant is call'd Cicer, of *κίαν* Strength ; because it is said to strengthen : It is also call'd *Arietana*, because the Seeds of it resemble the Head of a Ram.] Chiches, or Chick-Pease.

The Characters are ;

It hath a Pea-shap'd (or papilionaceous) Flower, which is succeeded by short swelling Pods, somewhat like the inflated Bladder of a Fish: The Seeds are shap'd somewhat like a Ram's-Head.

The Species are ;

1. CIGER ; *sativum*, flore candido. C. B. P. Garden Chiches, with a white Flower.
2. CIGER ; *sativum*, semine rufo. C. B. Manur'd Chiches, with reddish Seeds.
3. CIGER ; *sativum*, semine nigro. C. B. Manured Chiches, with black Seeds.
4. CIGER ; *sativum*, flore ex rubro purpurascens semine rubro. C. B. Manured Chiches, with purplish-red Flowers and red Seeds.

There are some other Varieties of this Plant preserv'd in curious Botanick Gardens abroad : But these here enumerated are the common Sorts, which are cultivated in the Kitchen-Gardens in France, Italy, Spain, &c. and, I believe, are all Seminal Varieties, which alter and change the Colour of their Flowers and Seeds, as do the common Garden-Beans.

This Plant is seldom cultivated in England, except in particular Gardens: Nor do I think it worth planting for Use where Peas will do well, which are so much preferable for Goodness, and much greater Bearers, producing above double the Quantity upon the same Ground: But in warmer Countries, where our delicate Sorts of Peas seldom thrive well, these may supply their Place; and, perhaps, in those Countries they are much more fruitful than with us.

The Seeds of these Chiches should be sown in March, in an open Situation, and upon a warm dry Soil, in Rows about two Feet asunder, and as thick as Peas are usually sown in the Rows. When the Plants are come up, the Ground must be hoe'd, and the Plants earth'd, as is practis'd for common Peas, to which this Plant agrees very well in its Culture. In June and July it will flower, and its Seeds will be ripe in August and September.

The People in France and Italy preserve them for boiling in the Winter-season, as we do our White and Grey Peas, to which these are somewhat akin.

CICHORIUM, [*Χιχόριον*, of which I find, because it is found every where in walking; or, as others say, of *χίμα* I go, and *Χήρα* a Place.] Succory.

The Characters are ;

It is one of the Milky Plants with a plain radiated Flower: The Flowers are produced from the Sides of the Branches, at the setting off of the Branches upon short Foot-stalks: The Cup of the Flower is like a contracted Seed-vessel: The Seeds are angular, umbilicated, and in Shape somewhat like a Wedge.

The Species are ;

1. CICHORIUM ; *latifolium*, sive *Endivia vulgaris*. Tourn. Common Broad-leav'd Endive.
2. CICHORIUM ; *angustifolium*, sive *Endivia vulgaris*. Tourn. Common Narrow-leav'd Endive.

3. CICHORIUM ; *crispum*. Tourn. Curled Endive.

4. CICHORIUM ; *crispum*, *angustifolium*. Boerb. Ind. Narrow-leav'd Curl'd Endive.

5. CICHORIUM ; *sylvestre*, sive *officinarium*. C. B. Wild Succory.

The first and second Sorts of Endive are now wholly disused in the Kitchen-Gardens, as being vastly inferior to the Curl'd Kinds, which are by much the larger and handsomer Heads.

The Seasons for sowing their Seeds is in May, June, and July, at four or five different times; for that which is first sown is very subject to run to Seed, especially if the Autumn prove warm and dry: But however, it is necessary to have a little sown in the Decrease of the Moon in May, for the first Crop; and again in June the middle and latter End; and for the last Crop, about the middle of July. These Seeds should be sown in an open Situation, and a good rich Soil, but not too thick. When the Plants are come up, and grown to be about two Inches high, they must be transplanted into another open good Spot of Ground, at about ten Inches distant every way, observing to trim off the Tops of the largest Leaves with your Knife before you plant them; as also to water them constantly every other Evening, until they have taken fresh Root: After which Time they will need no other Care, but to keep them clean from Weeds, until they have so spread as almost to meet and cover the Ground.

Then you should provide a Parcel of small Osier Twigs (or Bass-Mat) to tie up some of the largest to blanch; which should be done in a dry Afternoon, when there is neither Dew nor Rain to moisten the Leaves in the middle of the Plants, which would occasion their rotting soon after their being ty'd up. The Manner of doing it is as follows; viz. You must first gather up all the inner Leaves of the Plant, in a regular Order, into one Hand, and then take up those on the Outside that are sound, pulling off, and throwing away all the rotten and decay'd Leaves; observing to place the outside Leaves all round the middle ones, as near as possible to the natural Order of their Growth, so as not to cross each other: Then having got the whole Plant close up in your Hand, tie it up with the Twig, &c. at about two Inches below the Top, very close; and about a Week after go over the Plants again, and give them another Tie about the middle of the Plant, to prevent the Heart-Leaves from bursting out on one Side; which they are subject to do, as the Plants grow, if not prevented this way.

In doing of this you need only tie up the largest Plants first, and so go over the Piece once a Week, as the Plants increase their Growth; by which means you will continue the Crop longer than if they were all ty'd up at one time: For when they are quite blanch'd, which will be in three Weeks or a Month after tying, they will not hold sound and good above ten Days or a Fortnight, especially if the Season proves wet: Therefore it is that I would advise to sow at four different Seasons, that

that you may have a Supply as long as the Weather will permit. But in order to this, you must transplant all the Plants of the last sowing under warm Walls, Pales, or Hedges, to screen the Plants from Frost: And if the Winter should prove very sharp, you should cover them with some Peas-haulm, or such other light Covering, which should be constantly taken off in mild Weather: These Borders should also be as dry as possible; for these Plants are very subject to rot, if planted in a moist Soil in Winter.

Altho' I before directed the tying up of the Plants to blanch them, yet this is only to be understood for the two first Sowings; for after *Michaelmas*, when the Nights begin to be frosty, those Plants which are so far above-ground will be liable to be much prejudiced thereby; therefore the best Method is, to take up your Plants of the latter Sowings in a very dry Day, and with a large flat-pointed Dibble plant them into the Sides of Trenches of Earth, which are laid very upright, side-wise, towards the Sun, with the Tops of the Plants only out of the Ground, so that the hasty Rains may run off, and the Plants be kept dry, and secured from Frosts.

The Plant thus planted, will be blanched fit for Use in about three Weeks Time; after which it will not keep good long: You should therefore keep planting some fresh ones into Trenches every Fortnight at least, that you may have a Supply: And those which were last transplanted out of the Seed-beds, should be preserv'd till *February* or *March*, before they are planted to blanch; so that from this you may be supply'd until *April*, or later, according to the Season: For at this last planting into the Trenches it will keep longer than in Winter; the Days growing longer, and the Sun advancing with more Strength, dries up the Moisture much sooner than in Winter, which prevents the rotting of these Plants.

When your *Endive* is blanch'd enough for Use, you must dig it up with a Spade; and after having clear'd it from all the outside green and decay'd Leaves, you should wash it well in two or three different Waters, to clear it the better from Slugs and other Vermin, which commonly shelter themselves amongst the Leaves thereof; and then you may serve it up to the Table with other Sallading.

But in order to have a Supply of good Seeds for the next Season, you must look over those Borders where the last Crop was transplanted, before you put them into the Trenches to blanch; and make choice of some of the largest, foundest, and most curled Plants, in Number according to the Quantity of Seeds required: For a small Family, a dozen good Plants will produce enough Seeds; and for a large, two Dozen, or thirty Plants.

These should be taken up and transplanted under a Hedge or Pale at about eighteen Inches distant, in one Row about six Inches from the Hedge, &c. This Work should be done in the beginning of *March*, if the Season is mild, otherwise it may be deferr'd a Fortnight longer. When the Flower-stems begin to advance, they

should be supported with a Packthread, which should be fasten'd to Nails drove into the Pale or to the Stakes of the Hedge, and run along before the Stems, to draw them upright close to the Hedge or Pale; otherwise they will be liable to break with the strong Winds. Observe also to keep them clear from Weeds, and about the beginning of *July* your Seeds will begin to ripen: Therefore, as soon as you find the Seeds are quite ripe, you must cut off the Stalks, and expose them to the Sun upon a coarse Cloth to dry; and then beat out the Seeds, which must be dried, and put up in Bags or Papers, and preserv'd for Use in some dry Place. But I would here caution you, Not to wait for all the Seeds upon the same Plant; for if so, all the first ripe and best of the Seeds will scatter and be lost before the other are near ripe; so great a Difference is there in the Seeds of the same Plant being ripe.

The *wild Succory*, (of which there are some Varieties in the Colour of the Flowers) is seldom propagated in Gardens; it growing wild in unfrequented Lanes and Dunghills in divers Parts of *England*, where the Herb-women gather it, and supply the Markets for Medicinal Use.

CICUTA, properly signifies an Hollow intercepted between two Knots, of the Stalks or Reeds of which the Shepherds us'd to make their Pipes; as *Virgil* sings:

*Eft mibi disparibus septem compacta Cicutis,
Fistula* —

Cicuta. Hemlock.

The Characters are;

The Leaves are cut into many minute Segments: The Petals of the Flower are bifid, Heart-shap'd, and unequal: The Flower is succeeded by two short channelled Seeds.

The Species are;

1. **CICUTA**; major. C. B. Common or Greater Hemlock.

2. **CICUTA**; minor, *petroselinum similis*. C. B. Lesser Hemlock, or Fool's Parsley.

There are some other Varieties of this Plant preserv'd in curious Botanick Gardens; but the two Sorts here mentioned, are what we find wild in *England*.

The first Sort grows to a considerable Height, and is chiefly found upon the Sides of dry Banks in many Parts of *England*: The Leaves of this Plant are of a shining green Colour, and the Stalks are full of purple Spots; by which it is easily distinguish'd from any Plants that resemble it. This Sort is sometimes used in Medicine; tho' by many People it is thought to have a noxious Quality: But the Hemlock of the Antients, which was such deadly Poyson, is generally suppos'd to be very different from this.

The second Sort is of a smaller Growth, and so like Parsley, that some unskilful Persons have gather'd it, and us'd it as such; by which several Persons have suffer'd in their Health, and some have been destroy'd thereby.

These Plants are never propagated in Gardens for Use, but are gather'd by the Herb-women in the Fields.

CICU-

CICUTARIA ; [is so call'd from its Likeness to *Cicuta*.] Bastard Hemlock.

The Characters are ;

The Root is large and thick : The Stalks are thick, hollow, and jointed : The Leaves are like the greater Hemlock, but are thicker : The Seeds are long, thick, gibbous, and shaped somewhat like a Half-moon, and very much channelled.

The Species are ;

1. **CICUTARIA** ; *latifolia, fœtida*. C. B. Broad-leav'd stinking Bastard Hemlock.

2. **CICUTARIA** ; *fœtidissima, foliis atrovi- rentibus*. Jussieu. The most stinking Bastard Hemlock, with dark green Leaves.

These two Plants are seldom cultivated, unless in Botanick Gardens : They are of a very strong rank Smell, and are thought to contain a poisonous Quality. Whoever hath a mind to cultivate them, should sow their Seeds in a moist Soil in the Spring of the Year ; and when the Plants are come up, they should be planted out at about two Feet Distance, for they spread their Roots and Branches very far on either Side : The second Year after sowing they will produce ripe Seeds, but the Roots will abide many Years after.

CINARA ; vide Artichoke.

CINERARIA ; vide Jacobæa.

CIRCEA ; [Is said to be so call'd from *Circe*, the famous Enchantress, said to have enchanted *Ulysses* and his Companions : *Boerhaave* supposes it to be so call'd, because the Fruit of this Plant takes hold of Peoples Cloaths, and by this means draws them to it, as the Enchantress *Circe* was wont to do by her Enchantments.] Enchanter's Night-shade.

The Characters are ;

It hath a perennial creeping Root : The Leaves, which are whole, and shaped somewhat like those of Night-shade, are placed alternately upon the Branches : The Flower consists of two Leaves, which rest upon a two-leaved Empalement : The Flowers are succeeded by a Pear-shaped Fruit, which is burry on the Out-side, and divided into two Cells ; in each of which is contained, for the most part, two oblong Seeds.

The Species are ;

1. **CIRCEA** ; *Lutetiana*. Lob. Icon. Enchanter's Night-shade.

2. **CIRCEA** ; *minima*. Col. The Smallest Enchanter's Night-shade.

The first of these Plants is very common in moist shady Places, and under Hedges, in most Parts of England ; but the second hath not been found wild with us, tho' it grows in Plenty in the Woods near the Hague, where I gather'd it, and brought it into England, where it continues to retain its Difference from the common Sort, notwithstanding some People have supposed it to be the same. They are both great Runners in a Garden, for which Reason they should be planted (by those who would keep them for Variety) in some abject shady Part of the Garden, where few other Things will grow.

CIRCULATION of the Sap ; vide Sap.

CIRRI ; Are those fine Strings, or Hairs, by which some Plants fasten themselves, in order to their Support, as Ivy, &c.

CIRSIIUM ; [is so called of *Kίρσις*, a Circle about the farthest or last Intestine, i. e. the *Hæmorrhoides*, or Inflammation of the Anus ; because it is wont to be used to cure that Distemper.] Soft or Gentle Thistle.

The Characters are ;

It hath Leaves and Flowers very like those of the Thistle, but the Spines upon the Leaves are softer, and the Cup of the Flower is destitute of Spines.

The Species are ;

1. **CIRSIIUM**, *Anglicum*. Ger. The English Soft or Gentle Thistle.

2. **CIRSIIUM** ; *Britannicum, Clusii, repens*. J. B. The great English Soft Gentle, or Melancholy Thistle.

3. **CIRSIIUM** ; *maximum, Asphodeli radice*. C. B. The greatest Asphodel-rooted Gentle Thistle.

4. **CIRSIIUM** ; *maculis argenteis notatum*. Fourn. The White-spotted Gentle Thistle.

There are several other Species of this Plant, which are preserved in curious Gardens of Plants ; but as there is little Use or Beauty in them, so I shall pass them over in this Place.

The two first Species here named, grow wild in England ; the other two are Strangers, and only preserved for Variety in some few Gardens : They may all be propagated by sowing their Seeds in the Spring, in almost any Soil, but they require an open Situation ; and when the Plants come up, they should be separated to about two Feet Distance, for they spread very far, especially the two first, which are terrible Creepers under-ground, and therefore should not be placed near other Plants, lest they over-bear and destroy them. The three first Sorts are also increased by parting their Roots ; but the last is an Annual, and must either be sown every Spring, or the Seeds suffered to shed upon the Ground, which will come up without any Trouble.

CISTUS ; [is so call'd from *Κίστος* or *Κίστος*, Gr. Ivy, because the Antients believed the Leaves of this Plant did resemble the Ground-Ivy ; or because its little seminal Vessel is inclosed in a *Cistâ* or little Chest, as it were.] Rock Rose.

The Characters are ;

It hath the Appearance of a Tree : The Leaves are produced by Pairs opposite upon the Branches : The Cup of the Flower consists of three or five Leaves : The Flower consists of many Leaves, which are expanded in Form of a Rose, having abundance of Stamina or Threads in the Middle : From the Center of the Cup arises the Ovary, which is rough and hemispherical, and becomes a roundish or pointed Vessel, consisting of many Cells, in which are contained many small Seeds.

The

The *Species* are;

1. *Cistus*; *mas*, *folio oblongo incano*. C. B. The Male *Cistus* or Rock Rose, with oblong hoary Leaves.

2. *Cistus*; *mas*, *major*, *folio rotundiori*. *J. B.* The greatest Male *Cistus*, or Rock Rose, with roundish Leaves.

3. *Cistus*; *mas*, *folio brevior*. C. B. Short-leav'd Male *Cistus*, or Rock Rose.

4. *Cistus*; *mas*, *foliis undulatis*, & *crispis*. *Tourn.* Male *Cistus*, or Rock Rose, with wav'd and curl'd Leaves.

5. *Cistus*; *Ladanifera*, *Monspeliensium*. C. B. The Gum-bearing *Cistus*, or Rock Rose of Montpellier.

6. *Cistus*; *Ladanifera*, *Hispanica*, *salicis folio*, *flore candido*. *Tourn.* Spanish Gum-bearing *Cistus*, or Rock Rose, with Willow Leaves and white Flowers.

7. *Cistus*; *Ladanifera*, *Hispanica*, *salicis folio*, *flore albo*, *macula punicante insignito*. *Tourn.* Spanish Gum-bearing *Cistus*, or Rock Rose, with Willow Leaves, and white Flowers spotted with Purple.

8. *Cistus*; *Ledon*, *latifolium*, *Creticum*. *J. B.* Sweet broad-leav'd *Cistus*, or Rock Rose from Crete.

9. *Cistus*; *Ledon*, *foliis populi nigra*, *major*. C. B. Large sweet *Cistus*, or Rock Rose, with black Poplar Leaves.

10. *Cistus*; *Ledon*, *foliis populi nigra*, *minor*. C. B. Small sweet *Cistus*, or Rock Rose, with black Poplar Leaves.

11. *Cistus*; *Ladanifera*, *Cretica*, *flore purpureo*. *Tour. Cor.* Sweet Gum-bearing *Cistus*, or Rock Rose from Crete, with purple Flowers.

The various Kinds of these Plants are very great Ornaments to a Garden; their Flowers are produc'd in great Plenty all over the Shrubs, which tho' but of a short Duration, yet are succeeded by fresh ones almost every Day for above two Months successively. These Flowers are many of them about the Bigness of a middling Rose, but single, and of different Colours; the Plant continues green throughout the Year.

The first five and the eighth Sort will endure the Cold of our common Winters in the open Ground, provided they are planted in a dry Soil, and in a Situation where they may be shelter'd from the cold Winds, and will rise to the Height of five or six Feet, and may be easily train'd to form handsome Heads. These being intermix'd with flowering Shrubs of the same Growth, in small Wilderness Quarters, &c. add greatly to the Variety, and their Flowers continuing to shew themselves thro' the greatest Part of the Summer, renders them worthy of a Place in the best Gardens. The other Sorts are commonly preserv'd in Pots, and hous'd in Winter, tho' I believe most of them might be brought to stand abroad in Places that are well defended from the Cold.

These Sorts may all be propagated, by sowing their Seeds upon a gentle Hot-bed, or on a warm Border in the common Ground in March; and when the Plants are come up about three Inches high, they should be trans-

planted either into small Pots, or a Border of good light Earth, at about ten Inches Distance every Way: If they are planted into Pots, they should be remov'd under a common Hot-bed Frame in Winter, to defend them from the Frost, which may be hurtful to them while young, if they are not protected from it; but they should have as much open free Air as possible in mild Weather, and will require to be often refresh'd with Water.

In the Spring following, these Plants may be turned out of the Pots, with all the Earth preserv'd to their Roots, and planted in the Places where they are to remain, (for they are bad Plants to remove when grown old) observing to give them now and then a little Water, until they have taken fresh Roots; after which Time they will require no farther Care than to train them upright in the manner you would have them grow: But those Plants which were at first planted into a Border in the open Ground, should be arch'd over, and covered with Mats in frosty Weather, during the first Winter, but may be transplanted abroad the succeeding Spring: In removing of these Plants, you should be careful to preserve as much Earth about their Roots as you can; and if the Season should prove hot and dry, you must water and shade them, until they have taken fresh Root; after which they will require no other Culture than was before directed.

These Plants may also be propagated, by planting Cuttings of them upon a gentle warm Bed in May or June, keeping them shaded with Mats, and frequently refresh'd with Water until they have taken Root, which will be in about two Months Time; when you may transplant them into Pots filled with good fresh light Earth, which should be set in a shady Place until they have taken Root, and then may be exposed to the open Sun until October, when you should remove them into Shelter the first Winter; but the succeeding Spring you may plant them abroad, as was before directed for the Seedling Plants.

The seventh Sort is by much the most beautiful of all these *Cistus*'s: The Flowers, which are as big as a handsome Rose, is of a fine White, with a deep purple Spot on the Bottom of each Leaf. This Plant also abounds with a sweet glutinous Liquor, which exudes thro' the Pores of the Leaves in so plentiful a manner, in hot Weather, that the Surfaces of the Leaves are covered therewith. From this Plant (*Clusius* thinks) might be gathered great Quantities of the *Ladanum*, which is used in Medicine, in the Woods in Spain, where he saw vast Quantities of this Shrub growing.

But it is from the eleventh Sort, which Monsieur *Tournefort* says, the Greeks, in the *Archipelago*, gather this sweet Gum: In the doing of which (*Bellonius* says) they make use of an Instrument like a Rake, without Teeth, which they call *Ergastiri*: To this are tied many Thongs of raw and untanned Leather, which they rub gently upon the Bushes, that produce the *Ladanum*, that so that liquid

Moisture may stick upon the Thongs. After which they scrape it off with Knives: This is done in the hottest Time of the Day; for which Reason, the Labour of gathering this *Ladanum* is excessive, and almost intolerable, since they are obliged to remain on the Mountains for whole Days together, in the very Heat of Summer, or the *Dog-Days*: Nor is there any Person almost that will undertake this Labour, except the *Greek Monks*.

Monsieur *Tournefort* also relates the same in his *Travels*, where he says, That the Shrubs which produce the *Ladanum* grow upon dry sandy Hillocks, and that he observed several Country-Fellows in their Shirts and Drawers, that were brushing the Shrubs with their Whips, the Straps whereof, by being drawn over the Leaves of the Plant, licked up a sort of odorous Balsam sticking upon the Leaves, which he supposes to be Part of the nutritious Juice of the Plant which exudes thro' the Pores of the Leaves, where it remains like a fattish Dew, in shining Drops as clear as Turpentine.

When the Whips are sufficiently laden with this Grease, they take a Knife and scrape it clean off the Straps, and make it up into a Mass of Cakes of different Sizes: This is what comes to us under the Name of *Ladanum* or *Labdanum*. A Man that is diligent will gather three Pounds two Ounces per Day, or more, which they sell for a Crown on the Spot. This Work is rather unpleasant than laborious; because it must be done in the hottest Time of the Day, and in the greatest Calm. And yet the purest *Ladanum* is not free from Filth; because the Winds of the preceding Days have blown Dust upon these Shrubs, which, by the glewy Substance upon the Surfaces of the Leaves, is thereby detained and mixed therewith. But to add Weight to this Drug, they knead it up with a very fine blackish Sand, which is found in those Parts; as if Nature herself was minded to teach them how to adulterate this Commodity. It is no easy Thing to discover this Cheat, when the Sand has been well blended with the *Ladanum*: In order to which you must chew it for some Time, to find whether it crackles between the Teeth; and if it doth, you must first dissolve it, and then strain it, in order to purify away what has been added to it.

CITREUM; [κίτριν, Gr.] The Citron-Tree.

The Characters are;

It hath broad stiff Leaves like those of the Laurel, but without any Appendix (as hath the Orange): The Flowers consist of many Leaves, which expand in Form of a Rose: The Cup of the Flower is slender and fleshy, and is divided into five Segments at the Top: The Pistil of the Flower becomes an oblong, thick, fleshy Fruit, which is divided into many Cells, is very full of Juice, and contains several hard Seeds.

The Species are;

1. **CITREUM; vulgare. Tourn.** The Common or Ordinary Citron.

2. **CITREUM; dulci medullâ. Tourn.** The Sweet Citron.

3. **CITREUM; magno fructu. Tourn.** The Large Citron.

4. **CITRIOIDES; vulgô Citratum, Florentinum fructu magno, plerumque turbinate lævi ac suavi medullâ, cortice odoratissimo, foliis longioribus. Citro. Hort. Piss.** Florentine Citron, with large sweet Fruit, of a sweet-smelling Kind, and long Leaves.

5. **CITRIOIDES; seu Citratum, Florentinum, fructu mucronato & recurvo, cortice verrucoso, odoratissimo. Hort. Piss.** Florentine Citron, with a pointed Fruit, which is recurved, and a warted sweet-smelling Kind.

6. **CITRIOIDES; seu Citratum, Florentinum, fructu minori, fere rotundo, acriori medullâ, cortice odoratissimo. Hort. Piss.** Florentine Citron with small roundish Fruit, with a sharp Taste, and sweet-smelling Kind.

7. **CITRIOIDES; seu Citratum, Florentinum, odoratissimum fructu prolifero. Hort. Piss.** Sweet-smelling Florentine Citron, with Fruit coming out of each other.

There are several other Varieties of this Fruit, with which the *English* Gardens have been supply'd from *Genoa*, where is the great Nursery for the several Parts of *Europe* for these sorts of Trees: And the Gardeners who cultivate them there, are as fond of introducing a new Variety to their Collection, as the Nursery-men in *England* are of a new *Pear*, *Apple*, *Peach*, &c. So that the Varieties being annually increased, as are any of our Fruits from Seeds, there is like to be no End of the Variety of these, nor of the *Orange* and *Lemon-Trees*.

The most valuable Kind of these Fruits is the fifth, which is in so great Esteem, that the single Fruits are sold at *Florence* for Two Shillings each, and are sent as Presents to the Courts of Princes. This Fruit is not to be had in Perfection in any other Parts of *Italy* but in the Plain between *Pisa* and *Leghorn*: And altho' Trees of this Kind have been transplanted from that Spot to divers other Parts of *Italy*, yet they are found to lose much of that excellent Taste with which they abound in those Plains.

The several Sorts of *Citrons* are cultivated much in the same manner as the *Orange-Tree*; to which I shall refer the Reader, to avoid Repetition: but shall only remark, that these are somewhat tenderer than the *Orange*, and should therefore have a warmer Situation in Winter; otherwise, they are very subject to cast their Fruit. They should also continue a little longer in the House in the Spring, and be carry'd in again sooner in the Autumn; as also to have a warmer and better-defended Situation in the Summer, though not too much expos'd to the Sun in the Heat of the Day.

And as their Leaves are larger, and their Shoots stronger than those of the *Orange*, so do they require a greater Plenty of Water in the Summer; and in Winter they should have but little water at each time, which must be the oftener repeated. The Soil ought to be much the same as for the *Orange-Tree*, but not quite so strong.

The

The Common Citron is by much the best Stock to bud any of the Orange or Lemon Kinds upon ; it being the straightest and freest growing Tree. The Rind is smoother, and the Wood less knotty, than either the Orange or Lemon, and will take either Sort full as well as its own Kind ; which is what none of the other Sorts will do. And these Stocks, if rightly managed, will be very strong the second Year after sowing, and capable to receive any Buds, and will have Strength to force them out vigorously ; whereas it often happens, when these Buds are inoculated into weak Stocks, they frequently die, or remain till the second Year before they put out : And those that do shoot the next Spring after budding, are oftentimes so weak as hardly to be fit to remain, as being incapable to make a straight handsome Stem, which is the great Beauty of these Trees.

CYTRUL ; vide Pepo.

CLARY ; vide Horminum, or Sclarea.

CLAVICLE, [*Clavicus*, Lat.] a Clasper, or Tendril.

CLEMATITIS ; [*Κλημάτις*, of *κλῆμα* a Twig, a Sprig, &c. because it climbs up Trees with Claspers, like those of Vines. Hence it is also call'd *Virgultum ductile*, *Ranunculus obsequosus* ; and also *Antrogenomene*, and *Flammula*, as tho' producing a Carbuncle : For the Leaves being bruise'd and apply'd to the Skin, burn it into Carbuncles, as it is in the Pestilence : and *Flammula* ; because if one Leaf be crop'd in a hot Day in the Summer-season, and bruise'd and presently put to the Nostrils, it will cause a Smell and Pain like a Flame.]

The Characters are ;

It hath a perennial fibrose Root : The Leaves grow opposite upon the Stalks : The Flowers, which consist for the most part of four Leaves plac'd in Form of a Cross, are naked, having no Calyx : In the Centre of the Flower are many hairy Stamina (or Threads) which surround the Pointal : The Pointal afterwards becomes a Fruit, in which the Seeds are gathered, as it were, into a little Head, ending in a kind of Plume.

The Species are ;

1. CLEMATITIS ; *five* *Flammula surrecta* ; *alba*. C. B. Upright White Climber.

2. CLEMATITIS ; *cærulea, erecta*. C. B. Upright Blue Climber.

3. CLEMATITIS ; *Hispanica, surrecta, altera, & humilior, flore albicante*. H. R. Par. Low Spanish Climber, with a whitish Flower.

4. CLEMATITIS ; *sylvestris latifolia*. C. B. Great Wild Climber, or Travellers Joy.

5. CLEMATITIS ; *sylvestris, latifolia, foliis non incis.* Tourn. Great Wild Climber, or Travellers Joy, with undivided Leaves.

6. CLEMATITIS ; *peregrina, foliis pyri incis.* C. B. Spanish Climber, or Travellers Joy, with cut Leaves.

7. CLEMATITIS ; *Canadensis, trifolia dentata, flore albo*. H. R. Par. Three-leav'd Canada Climber, with a white Flower.

8. CLEMATITIS ; *cærulea, vel purpurea, repens*. C. B. Purple creeping Climber, or Single Virgins Bower ; *vulgô*.

9. CLEMATITIS ; *cærulea flore pleno*. C. B. Blue Climber with a double Flower, or Double Virgins Bower ; *vulgô*.

10. CLEMATITIS ; *repens rubra*. Boerb. Ind. Red creeping Climber.

11. CLEMATITIS ; *Orientalis, folio Apii, flore ex viridi flavescente, posterius reflexo*. T. Cor. Eastern Climber, with a Smallage Leaf, and a reflex'd Flower of a greenish Yellow.

12. CLEMATITIS ; *purpurea repens, petalis florum Coriaceis*. Banist. Cat. Purple creeping Climber, with stiff Petals.

The 1st, 2d, and 3d Sorts die to the Surface of the Ground every Winter ; but their Roots are of long Continuance, arising again in the Spring. The 2d and 3d usually grow with us about three or four Feet high, and produce great Quantities of Flowers ; but the 1st Sort is of humbler Growth, seldom rising above eighteen Inches high, but in other respects is very like the 3d.

These Plants are propagated either by Seeds, or parting of their Roots : But the former being a tedious Method, (the Plants seldom rising until the second Year after sowing, and are often two Years more before they flower) the latter is generally practis'd. The best Season for parting these Roots, is either in October or February ; either just before their Branches decay, or before they rise again in the Spring.

They will grow almost in any Soil or Situation : But if the Soil is very dry, they should always be new planted in the Autumn, otherwise their Flowers will not be so strong : But if the Soil be wet, it is better to defer it until the Spring. The Roots may be cut through their Crowns with a sharp Knife, observing to preserve to every Off set some good Buds or Eyes ; and then it matters not how small you divide them, for their Roots increase very fast. But if you part them very small, you should let them remain two Years before they are again remov'd ; that the second Year their Flowers may be strong, and the Roots multiply'd in Eyes, which in one Year's Time cannot be obtain'd.

These Plants are extreme hardy, enduring the Cold of our severest Winters in the open Air ; and are very proper Ornaments for large Gardens, either to be planted in large Borders, or intermix'd with other hardy Flower-Roots in Quarters of flowering Shrubs ; where, by being plac'd promiscuously in little open Places, they fill up those little Vacancies, and are agreeable enough. They begin to flower about the beginning of June, and often continue to produce fresh Flowers until October ; which renders them valuable, especially since they require very little Care in their Culture ; for their Roots may be suffer'd to remain several Years undisturb'd, if we do not want to part them, which will not in the least prejudice them.

The 4th and 5th Sorts are found wild in most Parts of England, especially the 4th, which grows upon the Sides of Banks, under Hedges,

Hedges, and extends its trailing Branches over the Trees and Shrubs that are near it: This Plant in the Autumn is generally cover'd with Seeds which are collected into little Heads, each of which having, as it it were, a rough Plume fasten'd to it, hath occasion'd the Country People to give it the Name of *Old Man's Beard*. The 5th Sort being no more than an accidental Variety of the 4th, is often found intermix'd therewith.

The 6th Sort is an *Ever-green*; and altho' it be a Native of a warm Country, yet I find is hardy enough to endure the Cold of our Climate in the open Air: This Plant commonly produces vast Quantities of large greenish yellow Flowers in the Depth of Winter, (provided it is not retarded by very severe Weather); for which Reason, together with the Beauty of its verdant green Leaves at that Season, it deserves a Place in every good Garden.

The 7th Sort is very like the 4th, which is our common Sort, from which it only differs in having but three Lobes to each Leaf, whereas ours have five or more.

The 8th and 10th Sorts, which are the most common in *Spain* and *Italy*, are at present very rare in *England*, being only to be found in curious Botanick Gardens: But the 9th Sort, which is a Variety of the 8th, is propagated in many Nurseries near *London*, (but particularly in that of Mr. *Christopher Gray*, near *Fulham*; where, amongst many other curious Exotick Trees and Shrubs, I saw this in very great Plenty): This Sort produces very double Flowers in great Quantities all over the Plant, which continue at least two Months, and render it valuable.

The 11th and 12th Sorts are also uncommon in *England* at present: The 11th was brought from the *Levant* by *Monf. Tournefort*, the chief Botanist to the late King of *France*. The 12th was brought from *America*, where it is found in divers Parts in great Plenty, but particularly in *Virginia* and *North Carolina*; from whence I have receiv'd Seeds of this Plant, which have grown with me in the *Physick Garden*.

The nine last mentioned Sorts are all of them trailing Plants, some of them growing to a very great Length, particularly the 4th, 5th, and 7th Sorts, which should be planted in large Wilderness Quarters, near the Stems of great Trees, to which they should be train'd up, where, by their wild Appearance, they will be agreeable enough.

The other Sorts are proper enough to intermix with flowering Shrubs of a middling Growth, where, being fasten'd to strong Stakes, they will rise about six or seven Feet high, and produce great Quantities of Flowers. These may also be planted to cover Seats in Wilderness Quarters, that are design'd for Shade; to which purpose these Plants are very well adapted, requiring little more Care than to train their Branches regularly at first, after which they will maintain themselves very well.

These Plants are propagated by laying down their tender Branches (as is practis'd for Vines)

in the Spring, which in one Year's Time will take Root, and may then be remov'd to the Places where they are design'd to remain; which should be done in the Spring, observing to lay a little Mulch upon the Surface of the Ground round their Roots, and to water them gently in dry Weather: In two Years after planting they will make very strong Shoots, which should be train'd up to Stakes, that they may not trail upon the Ground, which would spoil their flowering, and render them very unsightly. From this Time they will require no farther Care, than to cut out every other Year the decay'd Branches; and in the Spring, to shorten such Branches as may have grown too long and rambling for the Places where they are planted.

These also may be rais'd from Seeds, which should be sown either so soon as ripe, or very early in the Spring, in a Bed of fresh light Earth, or in Pots or Boxes fill'd with some Earth, because the Seeds of most of these Plants remain in the Ground until the second Spring before they appear, especially if they were not sown in Autumn. When the Plants come up, they must be carefully clean'd from Weeds; and in very dry Weather frequently water'd; and in the succeeding Spring they should be transplanted out into Nursery-beds, where they may remain two Years longer; by which Time they will have arriv'd at Strength to flower, and may then be remov'd to the several Places where they are to remain.

CLIMATE; [of *Kλίμα*, Gr. an Inclination,] is a Part of the Surface of the Earth bounded by two Circles parallel to the Equator; so that the longest Day in that Parallel, nearest to the Pole, exceeds the longest Day in that Parallel nearest to the Equator by some certain Space of Time, viz. half an Hour, till you come to Places situate nearly under the Arctick Circle; and a whole Hour, or even several Days, when you go beyond it.

The antient *Greek* Geographers reckon'd only seven *Climates* from the Equator towards the North Pole, and denominated them from some noted Place, through which the middle Parallel of the *Climate* pass'd: But the Moderns reckon up twenty-four.

The Beginning of the *Climate* is the Parallel Circle, wherein the Day is the shortest.

The End of the *Climate* is that wherein the Day is the longest.

The *Climates* therefore are reckon'd from the Equator to the Pole; and are so many Bands or Zones, terminated by Lines parallel to the Equator; tho' in Strictness there are several *Climates* in the Breadth of one Zone.

Each *Climate* only differs from its contiguous ones, in that the longest Day in Summer is longer or shorter by half an Hour in the one Place than the other.

As the *Climates* commence from the Equator, the first *Climate* at its Beginning has its longest Day precisely twelve Hours long; at its End twelve Hours and an half: The second, which begins where the first ends, viz. at twelve Hours and an half, ends at thirteen Hours:

Hours: And so of the rest, as far as the Polar Circles.

Hear what Geographers call *Hour-Climates* terminate, and *Month-Climates* commence.

As an *Hour Climate* is a Space compriz'd between two Parallels of the Equator, in the first of which the longest-Day exceeds that in the latter by half an Hour; so the *Month Climate* is a Space between two Circles parallel to the Polar Circles, whose longest Day is longer or shorter than that of its contiguous one by a Month or thirty Days.

The Antients, who confin'd the *Climates* to what they imagin'd the habitable Part of the Earth, only allow'd of seven, as has been said: The first they made to pass through *Meroe*, the second through *Siennæ*, the third through *Alexandria*, the fourth through *Rhodes*, the fifth through *Rome*, the sixth through *Pontus*, and the seventh through the Mouth of the *Boristhenes*.

The Moderns, who have sail'd farther towards the Poles, make thirty *Climates* on each Side; and because the Obliquity of the Sphere makes a little Difference in the Length of the longest Day, some of them make the Difference of the *Climates* but a Quarter of an Hour instead of Half an Hour.

The Term *Climate* is vulgarly bestow'd on any Country or Region differing from another, either in respect of the Seasons, the Quality of the Soil, or even the Manners of the Inhabitants, without any Regard to the Length of the longest Day.

CLINOPODIUM; [*Κλινόπους*, of *κλινε* a Bed; and *πούς*, Gr. a Foot, as though the Feet of a Bed, (because according to *Dioscorides*) the Stalks of this Plant resemble the Feet of a Bed.] Field-Basil.

The Characters are;

It is a Plant with a labiated Flower, consisting of one Leaf, whose upper Lip is upright, roundish, and generally split in two, but the Beard, or under Lip, is divided into three Segments: These Flowers are dispos'd in Whorles round the Stalks, and are succeeded by oblong Seeds.

The Species are;

1. **CLINOPODIUM**; *origano simile, elatius, majore flore. C. B.* The Taller Field-Basil, with a large Flower resembling Bastard-Marjoram.

2. **CLINOPODIUM**; *origano simile, flore albo. C. B.* Field-Basil, with a white Flower, resembling Bastard-Marjoram.

3. **CLINOPODIUM**; *arvense, ocymi facie. C. B.* Wild Field-Basil, resembling Basil.

4. **CLINOPODIUM**; *Alpinum, roseum, satureja foliis. Boc. Muss.* Alpine Field Basil, with Leaves like Savory.

5. **CLINOPODIUM**; *Virginianum, angustifolium, floribus, amplis luteis, purpureo-maculatis, cujus caulis, sub quovis verticillo, decem vel duodecim foliolis rubentibus est circumcinctus. Bani-ster. Pluk. Phyt. Tab. 24.* Narrow-leav'd Virginian Field-Basil, with large yellow Flowers spotted with Purple.

The first Sort grows wild upon dry chalky Hills in divers Parts of England. The second is a Variety of the first, from which it only

differs in the Colour of the Flower. These Sorts do abide many Years, and may be propagated in a Garden, by either sowing their Seeds or parting of their Roots; the latter of which is the most expeditious Method, as also the surest Way to preserve the white-flowering Kind in its Colour, because it may return back to the Purple Kind from which it at first degenerated. These Plants should have a light Soil, and an open Situation, in which they will thrive exceedingly.

The third Sort is also found upon very stony or gravelly Hills in several Parts of England; but this being an annual Plant is only propagated by Seeds, which should be sown soon after they are ripe, otherwise they will hardly grow: This must have a very poor stony Soil, in which it chiefly delights.

The fourth Sort is also an annual Plant, which was brought from the Alps: This should be sown in the Spring of the Year, in almost any Soil, it being a very good-natur'd Plant, and will thrive in any Part of the Garden.

The fifth Sort grows wild in *Virginia* and *Carolina*; from whence the Seeds have been sent over, which grow very well with us, and are hardy enough to resist our Cold in the open Air, if planted in a dry Soil.

CLYMENUM; [*κλύμενον*, of *κλύνω*, Gr. to roll, because the Branches of this Plant embrace whatever Plants do grow near them with their Tendrils.] Chickling-Vetch.

The Characters are;

The Stalks, Flowers, and Fruits of this Plant are like those of *Lathyrus*, but the Leaves consist of many Conjugations plac'd on a Mid-rib, which ends in a Tendril.

The Species are;

1. **CLYMENUM**; *Hispanicum, flore vario siliquâ planâ. Tourn.* Spanish Chickling-Vetch, with a variable Flower and a plain Pod.

2. **CLYMENUM**; *Hispanicum, flore vario siliquâ articulata. Tourn.* Spanish Chickling-Vetch, with a variable Flower and a jointed Pod.

3. **CLYMENUM**; *Bithynicum, siliquâ singulari, flore minore. Jessen.* Bithynian Chickling-Vetch, with a single Pod and smaller Flower.

4. **CLYMENUM**; *Parisiense, flore caeruleo. Tourn.* Common Chickling-Vetch with a blue Flower.

5. **CLYMENUM**; *Græcum, flore maximo singulari. T. Cor.* Greek Chickling-Vetch, with a large single Flower.

The first, second, third, and fifth Sorts are Annuals, and must be sown every Year, (as is practis'd for the *Sweet-Pea*): If they are sown in August, in a warm Border, they will stand through the Winter, and flower early in the succeeding Spring, by which Method you may be sure to obtain good Seeds; whereas those which are sown in the Spring, are many times destroy'd by the Rains in Autumn before their Seeds are perfected. These Plants delight in a dry Soil and an open Situation, for if they are over-hung by Trees, &c. they seldom come to any Perfection.

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Those of these Plants which were sown in *Autumn*, will begin to flower in *May*, and continue to produce new Flowers till *July*; about which time the Seeds of their early Flowers will be perfected. Their Flowers are in Shape like those of the *Pea*, but being of variable Colours, do make a pretty Variety in a Garden; and if the Plants are supported with Sticks, they may be kept in a small Compass. The fourth Sort hath a perennial Root, which multiplies very fast, soon over-running a Spot of Ground, and should therefore be kept in a Pot where the Roots will be confin'd, and thereby the Plant caus'd to produce a greater Quantity of Flowers than it would naturally do if its Roots had full Liberty.

CNICUS;

The Characters are;

It hath flosculous Flowers; consisting of many Florets, which are multified and stand upon the Embryo: These Florets are enclos'd in a scaly Cup surrounded with Leaves.

The Species are;

1. CNICUS; *sylvestris, hirsutior, five Carduus Benedictus*. C. B. The Blessed Thistle; *vulgô*.
2. CNICUS; *atractylis lutea dictus*. H. L. The yellow Distaff-Thistle; *vulgô*.
3. CNICUS; *perennis, caeruleus, Tingitanus*. H. L. Tangier perennial blue Distaff-Thistle.
4. CNICUS; *Creticus, atractylidis folio & facie, flore leucophæo*. T. Cor. Canada Distaff-Thistle, with whitish Flowers.
5. CNICUS; *Hispanicus, arborescens, foetidissimus*. Tourn. Stinking Spanish Tree Distaff-Thistle.

The Blessed Thistle is cultivated in Gardens for the Herb, which is dy'd and preserv'd for medicinal Uses, but of late Years it hath been in less Use than formerly, for which Reason there is but little of it now propagated.

This being an annual Plant, is only rais'd by Seeds, which should be sown in *Autumn*, or very early in the Spring: When the Plants are come up, they should be either transplanted, or hoe'd out to about nine or ten Inches Distance from each other, that the Plants may have Room to spread, observing also to keep them clear from Weeds; and when the Plants are in full Flower, they should be cut off and laid to dry in a shady Place; and after they are thoroughly dry, they may be tied up into Bundles, and hung up in a dry Room upon Strings in Rows, so that the Air may pass freely between them, which will prevent their growing mouldy or rotting, which they are very subject to, if laid too close, or kept in a moist Place.

The other Varieties are only preserv'd in curious Botanick Gardens; they may be propagated by sowing their Seeds in the Spring in a warm dry Soil, and the Plants reduc'd to about two Feet Distance: They will flower in *July*; and if the *Autumn* is favourable, their Seeds will be perfected in *September*.

COAST-MARY; vide Balsamita.

COCCIGRIA; vide Cotinus Coriaria.

COCHLEARIA; [is so call'd of *Cochleare*, Lat. a Spoon; because the Leaves of this Plant are hollow'd like a Spoon.] Spoon-wort, or Scurvy-grafs.

The Characters are;

The Flower consists of four Leaves, which are dispos'd in Form of a Cross: From the Flower-Cup arises the Pointal, which becomes an almost globular Fruit, divided into two Cells by an intermediate Partition, to which the Valves adhere on both Sides, and are furnish'd with many round Seeds.

The Species are;

1. COCHLEARIA; *folio subrotundo*. C. B. Scurvy-grafs with a roundish Leaf, or Common Scurvy-grafs.
2. COCHLEARIA; *folio sinuato*. C. B. Scurvy-grafs with a sinuated Leaf, or Sea Scurvy-grafs; *vulgô*.
3. COCHLEARIA; *minima, ex montibus Wallia. Sher. Boerh. Ind.* The least Scurvy-grafs, from the Welsh Mountains.
4. COCHLEARIA; *folio cubitali*. Tourn. Horse-Radish; *vulgô*.

The first of these Species is propagated in Gardens for Medicinal Uses: This is done by sowing the Seeds in *July*, soon after they are ripe, in a moist shady Spot of Ground; and when the Plants are come up, they should be thin'd so as to be left at about four Inches Distance each Way. The Plants that are taken out may be transplanted into other shady Borders, if you have Occasion for them; otherwise they may be hoe'd out, (as is practis'd for Onions, Carrots, &c.) and at the same time all the Weeds may be hoe'd down, so as to clear the Plants intirely from Weeds, that they may have Room to grow strong. In the Spring these Plants will be fit for Use; and those that are suffer'd to remain will run up to Seed in *May*, and perfect their Seeds in *July*. If this Plant is sown in the Spring, the Seeds seldom grow well; therefore the best Time is soon after they are ripe: The Plants rarely live after producing Seeds; so that it should be sown every Year, to have it for Use.

The Sea Scurvy-grafs is also us'd in Medicine; but this grows in the Salt Marshes in *Kent* and *Essex*, where the Salt Water overflows it almost every Tide; and can rarely be made to grow in a Garden, or at least to last longer there than one Year: But it being so easily gather'd in the Places before mention'd, the Markets are supply'd from thence by the Herb-women, who make it their Business to gather this Herb.

The Little Welsh Scurvy-grafs is an abiding Plant, and may be preserv'd in a Garden, if planted in a strong Soil, and a shady Situation. This is preserv'd in curious Gardens of Plants, but is not of any Use.

The Horse-Radish is propagated by Cuttings or Buds from the Sides of the old Roots. The best Season for this Work is in *October* or *February*; the former for dry Lands, and the latter for moist. The Manner of doing it is as follows: Provide your self with a good

good Quantity of Off-sets, which should have a Bud upon their Crowns: but it matters not how short they are; therefore the Upper-part of the Roots which are taken up for Use, should be cut off about two Inches long with the Bud to it, which is esteem'd the best for Planting. Then make a Trench ten Inches deep, in which you should place the Off-sets at about four or five Inches Distance each way with the Bud upwards, covering them up with the Mould that was taken out of the Trench: Then proceed to a second Trench in like manner, and continue the same until the whole Spot of Ground is planted. After this, level the Surface of the Ground even, observing to keep it clear from Weeds, until the Plants are so far advanced as to be strong enough to over-bear and keep down the Weeds. With this Management, the Roots of the *Herse-Radish* will be long and strait, and free from small lateral Roots; and the second Year after planting will be fit for Use. 'Tis true, they may be taken up the first Year; but then the Roots will be but slender; therefore it is the better way to let them remain until the second Year. The Ground in which this is planted ought to be very rich, otherwise the Roots will make but a small Progress.

COCOS; vide *Palma Nucifera*.

CODLIN-Tree; vide *Malus*, or *Apple-Tree*.

COFFEE-TREE; vide *Jasminum*.

COLCHICUM, is so call'd, from *Colchis* a Province of the *Levant*; (which is now call'd *Mingrelia*;) because this Plant was formerly very common in that Place.

The Characters are;

It hath a Flower consisting of one Leaf, which is shap'd like a Lily, rising from the Root in Form of a small Tube, and is widened gradually into six Segments: The Pointal rises from the Bottom of the Flower, ending in small Threads, and turns to an oblong triangular Fruit, divided into three Cells, which are full of roundish Seeds: It hath also a solid bulbous Root, which is cover'd with a membranous Skin.

The Species are;

1. COLCHICUM; commune; C. B. Common Meadow-Saffron.
2. COLCHICUM; Anglicum, album. Park. English white Meadow-Saffron.
3. COLCHICUM; pleno flore. C. B. The Double-flower'd Meadow-Saffron.
4. COLCHICUM; floribus Fritillaria instar tessellatis, foliis planis. M. H. Meadow-Saffron with Flowers chequer'd like those of the *Fritillaria*, and smooth Leaves.
5. COLCHICUM; Chionense, floribus Fritillaria instar tessellatis, foliis undulatis. M. H. Meadow-Saffron with chequer'd Flowers and wav'd Leaves, commonly call'd *Colchicum Chio*.
6. COLCHICUM; latifolium; variegatum. C. B. Broad-leav'd strip'd Meadow-Saffron.
7. COLCHICUM; vernal, Hispanicum. C. B. Spring-flowering Meadow-Saffron.
8. COLCHICUM; Candidum, multiflorum. C. B. Many-flower'd white Meadow-Saffron.

The first of these Species is found in moist Meadows in several Parts of *England*. The second is a Variety of the first, from which it only differs in the Colour of the Flower. The third Sort also originally came from the first; but is preserv'd in Gardens, for the Doubleness of its Flowers. The fourth Sort is a Stranger to our Island, and is suppos'd to have been brought from the *Levant*, with the fifth Sort, which differs from the fourth in having the green Leaves very much waved on the Edges. The Root of one of these two Species is thought to be the *Hermodactyl* of the Shops. The seventh Sort hath fine, broad, variegated, green Leaves, for which it is greatly esteem'd. The eighth Sort is valuable for producing its Flowers early in the Spring; as is the ninth, for producing a great Number of Flowers.

These are all very pretty Varieties for a Flower-Garden, most of them producing their Flowers in Autumn, when few other Plants are in Beauty. The Flowers come up and are blown some Time before the green Leaves appear, and are therefore by some call'd *Naked Ladies*. The green Leaves come up in Winter, and in Spring are extended to a great Length: In May the green Leaves begin to decay; soon after which Time, is the proper Season to transplant their Roots; for if they are suffer'd to remain in the Ground till August, they will send forth fresh Fibres: after which Time it will be too late to remove them. The Roots may be kept above-ground until the Middle of August; at which Time if they are not planted, they will produce their Flowers as they lie out of the Ground: but this will greatly weaken their Roots. The Manner of Planting their Roots being the same as *Tulips*, &c. I shall forbear mentioning it here, referring the Reader to that Article: And also for Sowing the Seeds, by which Means new Varieties may be obtain'd, I shall refer to the Article of *Xyphion*, where there will be proper Directions for this Work.

COLD, signifies something devoid of Heat, or which does not contain in it any Particles of Fire; according to which Definition, Cold is a mere Negative Term. And this is agreeable to the Sentiments of most of our Modern Philosophers, who suppose Cold to consist in a mere Privation or Diminution of Heat.

Others, much on the same Principle, define Cold to be that State of the minute Parts of a Body, wherein they are agitated more slowly and faintly than those of the Organs of Feeling. And in this Sense Cold is a mere Term of Relation: And hence the same Body becomes liable to be perceiv'd Hot or Cold, as the Particles of it are in greater or lesser Degree of Motion than those of the sensible Organ.

Heat is suppos'd to consist in a particular Motion of the Parts of the Hot Body: And hence the Nature of Cold, which is its Opposite, is easily deducible; for we find that Cold extinguishes, or rather abates Heat. Whence it seems to follow, that those Bodies are Cold which check and restrain the Motion of the Particles wherein Heat consists.

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There are three Kinds of Bodies that can do this, *viz.* either those whose Particles are perfectly at Rest; or those whose Particles are indeed agitated, but with less Violence than those of the Hot Body to which they are apply'd; or, lastly, such whose Particles have a Motion proper for exciting the Sensation of Heat, but move with a different Determination so as to retard and change the Motion of the Particles of the Organ.

Hence three different Kinds of Cold or Cold Bodies, do proceed.

The 1st, is that Cold common to all hard Bodies which consists in the Rest of their Parts.

The 2d, is that which rises from plunging any Part of the Body in Water; which consists in this, that the Parts of our *Præcordia* being more briskly agitated than those of the *Fluid*, do communicate part of their Motion to it.

The 3d, the Cold felt on the Collection of warm Air with a Pan, or in blowing hot Breath out of our Mouth with the Lips close shut; which consists in this, that the direct Motion of the Particles of Air do in some measure change and rebate the Motion and Determination of the Parts of the Body: And hence it is that a cold Body cannot cool another without heating it self.

Hence also it proceeds, that the more the Parts of a *frigid* Body are at Rest, the more the Particles of a warm Body that is apply'd to heat them, must lose of their Motion, and consequently of their Heat.

Thus there being more quiescent Parts in a Marble than in Wood, which is full of Pores and Interstices, the Marble is felt colder than the Wood. And hence also we may understand why Air near Marble and other dense Bodies feels somewhat colder than in other Places.

On this Principle the two latter Kinds of Cold appear somewhat more than Privations: The Particles inducing the Cold may be esteem'd real frigoric Corpuscles; and Coldness may be deem'd a real Quality, as well as *Horness*. These Particles do not only check the Agitation of those continually diffus'd from the Inner Parts of an Animal to the Outer; but having an elastick Power, they bend and hang about the Filaments of the Body, pinch and squeeze them; and hence is that acute pungent Sensation call'd Cold.

That Cold is more than a mere Relation or Comparison, is evident from its having real and positive Effects; such as *Freezing*, *Congelation*, *Condensation*, *Rarefaction*, *Bursting*, &c.

Dr. Clark takes Cold to be owing to certain Nitrous and other Saline Particles, endued with particular Figures proper to produce such Effects. Hence *Sal-Armoniack*, *Salt-Petre* *Salt of Urine*, and many other *Volatile* and *Alkalizate Salis* mix'd with Water, increase its Degree of Cold very sensibly.

Hence also comes that popular Observation, That Cold prevents Corruption. Which, however, must not be admitted without an Exception: Since if a hard porous Body have its Interstices fill'd with Water, and this be too

much dilated by freezing, the including Body will be burst. And thus it is that Cold proves destructive to the Parts of some Plants: As it happen'd in the Winter Anno 1728, when in several Trees, whose Trunks were much expos'd to the South-West, the Sap being thereby rarefy'd by the Warmth of the Sun, which for several Days, at the Beginning of the severe Frost, shone with an uncommon Heat, and the Nights coming on to extreme Cold, whereby the rarefy'd Sap was so suddenly condens'd, that the Sap-Vessels could not contain it, and thereby burst off the Bark of many Trees almost from Top to Bottom, and this chiefly on the South-West Side of the Trees, as it did of two large Occidental *Plane-Trees* in the Physick-Garden at Chelsea, and several *Pear* and other *Fruit-Trees* in the Nurseries of Mr. Francis Hunt at Putney.

Dr. Boerhaave says, That there is no such Thing in all Nature as absolute Cold; that the most severe he had ever known, was three Years before this was wrote, that then the Water would freeze while it ran down his Hand, and yet even then the Cold was not so complete, but that he could make an artificial Cold greater by twelve Degrees.

Though much might be said as to the Effects of Cold on Plants, I shall only conclude with the Observation of the Reverend Mr. Hales, who in the Conclusion of his excellent Treatise call'd *Vegetable Statics*, says,

The Considerable Quantity of Moisture, which is perspir'd from the Branches of Trees during the cold Winter-season, plainly shews the Reason, why in a long Season of cold North-Easterly Winds, the Blossoms and tender young-set Fruit and Leaves are, in the early Spring, so frequently blasted, *viz.* by having the Moisture exhaled faster than can be supply'd from the Trees; for doubtless Moisture rises slower from the Root, the colder the Season is, tho' it rises, in some Degree, all the Winter; as is evident, as he says, from his sixteenth Experiment in the said Book.

And from the same Cause it is, that the leafy Spires of Corn are by these cold drying Winds often faded and turn'd yellow, which makes the Husbandman; on these Occasions, wish for Snow; which, tho' it be very cold, yet it not only defends the Root from being frozen, but also screens the Corn from these drying Winds, and keeps it in a moist, florid, supple State.

It seems therefore to be a reasonable Direction, which some Authors who write on Agriculture and Gardening, give, *viz.* during these cold drying Winds, when little Dew falls to water the Trees in dry Soils, in the blossoming Season, and while the young-set Fruit is tender; and provided there is no immediate Danger of a Frost, or in case of continu'd Frost, to take Care to cover the Trees well, and at the same time to sprinkle them with Water, which is imitating Nature's Method of watering every Part.

As to sloping Shelters over Wall-trees, he says: I have often found, that when they are so broad as to prevent any Rain or Dew coming

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at the Trees, they do more Harm than Good in these long Eafterly drying Winds, because they prevent the Rain and Dews falling on them, which would not only refresh and supple them, but also convey Nourishment to them: But in case of sharp Frost after a Shower of Rain, these Shelters and other Fences must needs be of excellent Use to prevent the almost total Destruction occasion'd by the Freezing of the tender Parts of Vegetables when they are full saturate with Moisture.

COLEWORTS; *vide* Brassica.

COLOCYNTHIS; [*Κολοκύνθη*, of *κολοκύνθη*, it moves the Belly; or of *κλόου κυάνη*, Dog's-meat, by way of Irony, because of the great Bitterness.] *Coloquintida* or Bitter Gourd.

The Characters are;

It is in all respects like the Gourd, excepting the Leaves of this Plant being deeply jagged, and the Fruit being excessively bitter and not eatable.

The Species are;

1. **COLOCYNTHIS**; *fructu rotundo, major*. C. B. The greater *Coloquintida*, with a round Fruit.
2. **COLOCYNTHIS**; *fructu Aurantio simili*. Tourn. *Coloquintida*, with a Fruit resembling an Orange.

There are several other Varieties of this Plant, which are very common in divers Parts of the East and West-Indies; but as few of them come to any Maturity with us, so I shall pass them over, with only observing, that whoever hath a mind to cultivate any of these Plants, must sow them upon a Hot-bed, and manage them as is directed for raising Early Cucumbers; to which I shall refer the Reader.

COLUMBINE; *vide* Aquilegia.

COLUTEA; Bladder-Sena.

The Characters are;

It hath a papilionaceous (or Butterfly) Flower, which is succeeded by Pods, somewhat resembling the inflated Bladders of Fishes, in which are contain'd several Kidney-shap'd Seeds.

The Species are;

1. **COLUTEA**; *vesicaria*. C. B. Bladder-Sena.
2. **COLUTEA**; *vesicaria, vesiculis rubentibus*. J. B. Bladder-Sena, with reddish-coloured Pods.
3. **COLUTEA**; *Orientalis, flore sanguinei coloris, lutea macula notata*. T. Cor. Eastern Bladder-Sena, with Blood-colour'd Flowers spotted with Yellow.
4. **COLUTEA**; *Æthiopica, flore phœnicia, folio barba jovis*. Breyn. Cent. Ethiopian Bladder-Sena, with Scarlet Flowers, and Leaves like the Silver Bush.
5. **COLUTEA**; *Africana, annua; foliis parvis, mucronatis, vesiculis compressis*. Hort. Amst. African annual Bladder-Sena, with small pointed Leaves and compress'd Pods.

The two first Sorts are promiscuously sold by the Gardeners near London, amongst other flowering Shrubs, and are seldom distinguish'd but by Botanists.

These are propagated by sowing their Seeds any Time in the Spring, in a Bed of common Earth; and when the Plants are come up, they must be kept clear from Weeds; and the Michaelmas following, they should be transplanted either into Nursery-Rows, or in the Places where they are design'd to remain; for if they are let grow in the Seed-bed too long, they are very subject to have downright Tap-roots, which renders them unfit for Transplantation: Nor should these Trees be suffer'd to remain too long in the Nursery before they are transplanted, for the same Reason.

These Shrubs grow to the Height of eight or ten Feet, and are very proper to intermix with Trees of a middling Growth in Wilderness-quarters, or in Clumps of Flowering-trees, where the Oddness of their Flowers and Pods will make a pretty Variety.

The third Sort was brought from the Levant by Mons. Tournesort to the King's Garden at Paris; from whence several curious Gardens have been supply'd with this beautiful Plant: This is also rais'd by sowing the Seeds in the Spring, either in a moderate Hot-bed, or in a warm Border; and when the Plants are come up about four Inches high, they should be transplanted into Pots fill'd with light fresh Earth, and during the first Winter should be shelter'd under a common Hot-bed Frame; and the Spring following, they may be taken out of the Pots and planted into a warm Border, where they will thrive and flower the third Year from Seed.

The fourth Sort is tenderer than any of the former, and should be sown on a Hot-bed, and afterwards transplanted into Pots, and manag'd as was directed for the third Sort, and in the Spring put into warm Borders under a good Wall, where it will flower and seed the second Year, and if the Winters prove mild, will remain for two or three Years, producing great Quantities of beautiful Scarlet Flowers; but if the Winter proves hard, or the Soil is moist wherein it is planted, it seldom stands through a Winter abroad. This Plant is by most People preserv'd in Green-houses with Oranges, Myrtles, &c. But in this Management they are subject to grow very weak, for Want of more free open Air than can be given with Safety to the other Trees, therefore the best Method is, to preserve them, during the Winter, in an open Frame, where the Glasses may be kept off in mild Weather, and put on in frosty cold Nights, by which hardy Management the Plants will produce a greater Quantity of Flowers than when they are drawn in a House.

The fifth Sort is an annual Plant, seldom rising above three Feet high with us, and is but of very little Beauty: This is preserv'd in curious Gardens of Plants. The Management of it being much the same as the *Balsamina*, I shall refer the Reader thereto for Instructions.

COLUTEA SCORPIOIDES; *vide* Emerus.

COLLIFLOWER; *vide* Brassica.

COMA AUREA; [so call'd from the Golden Colour of its Flowers.] Goldyllocks.

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The Characters are ;

It hath a fibrose perennial Root ; the Leaves, which are in great Numbers, are produc'd alternately on every Side the Branches : The Cup of the Flower is not specious : The Flowers are yellow, and produc'd either singly, or in an Umbel upon the Tops of the Branches ; to which may be added, it hath the Appearance of a Shrub.

The Species are ;

1. COMA AUREA ; Germanica, Park. Theat. German Goldylocks.

2. COMA AUREA ; Africana, fruticans, foliis linearibus angustis major. Hort. Amst. African shrubby Goldylocks, with narrow Toad-Flax Leaves.

3. COMA AUREA ; Africana, fruticans, foliis Crithmi maritimi. Hort. Amst. African shrubby Goldylocks with Samphire Leaves.

4. COMA AUREA ; Africana, fruticans, foliis glaucis & in extremitate trifidis. Hort. Amst. African shrubby Goldylocks, with Sea-green Leaves, which are divided into three Parts at their Extremities.

5. COMA AUREA ; Africana, fruticans, foliis glaucis longis tenuibus multifidis, apice pinnularum trifidis. Boerb. Ind. alt. Shrubby African Goldylocks, with long narrow Sea-green Leaves, which are divided into many Parts, each of which are trifid at their Points.

The first of these Plants is very hardy, and will endure to be planted in the open Ground : This is propagated by parting the Roots in the Spring, or by planting Cuttings in any of the Summer Months, which if water'd and shaded will take Root in six Weeks-time, when they may be transplanted into the Borders where they are to remain for good : This Plant produces very pretty Umbels of Gold-colour'd Flowers upon the Tops of the Branches, which continue in Beauty for a long Time, which renders it worthy of a Place in every good Garden. The other four Sorts are tenderer, and must be preserv'd either in a Green-house or under a Hot-bed Frame in Winter.

These are propagated by planting their Cuttings in any of the Summer-Months in a Bed of light Earth ; which if kept shaded and water'd, will take Root in two Months time ; when they must be planted into Pots fill'd with fresh light Earth, and may be expos'd to the open Air until October ; at which Time they should be remov'd to Shelter, lest the Morning Frosts should injure them : But they require to have a great Share of free open Air in mild Weather, for if they are shut up too close they are very subject to Mouldiness, and their younger Branches are very apt to decay : They must also have frequent, but moderate Waterings in Winter ; and in the Spring, should be remov'd into the open Air as soon as possible, observing to do it by degrees, that they may not receive a great Check thereby. With this Management these Plants will some of them grow to be eight or nine Feet high, and become very woody, and will produce great Quantities of Flowers through most Part of the Year, which renders them worthy of a Place in a good Green house.

COMMELINA: This Plant was so call'd by Father Plumier, from Doctor Commeline, a famous Professor of Botany at Amsterdam.

The Characters are ;

The Leaves are produc'd alternately, and surround the Stalks at their Base, being in Shape somewhat like the Ephemerum : The Stalks trail upon the Ground, and grow very branchy : At setting on of the Branches between the Wing of the Leaf and the Stalk is produc'd a Flower which consists of two Leaves, which are plac'd in the Form of two Wings, much after the manner of the Butterfly Flowers : From the upper Part of the Flower is produc'd three short Stamina's (or Threads) ; upon which are fasten'd yellow Apices, which resemble the Head of a Mushroom : In the under Part of the Flower are produc'd three other Male Stamina's, which are thicker and longer than the other : The Ovary is produc'd in the Center of the Flower, which is extended into a long intorted Tube, and becomes an oblong Fruit, divided into two Cells, in each of which is contain'd one oblong Seed.

There is but one Species of this Plant at present known, which is,

COMMELINA ; graminea, latifolia, flore cæruleo. Plum. Nov. Gen. Broad Grass-leav'd Herb Commeline, with blue Flowers.

This Plant seldom continues with us longer than one Year ; But the Seeds, which are annually ripen'd, falling to the Ground, will grow again, so that we need be at no farther Trouble than to allot this Plant a Place in a warm Border, and not suffering it to be destroy'd, where it will maintain itself without any Culture. The Stalks of this Plant striking Roots at the Joints as it lies upon the Ground, the Plant may be increas'd fast enough in Summer by cutting these off, and transplanting them out into a fresh Spot of Ground, where they will greatly increase. The Seeds of this Plant should be sown as soon as it is ripe, for if it be kept till Spring, it seldom comes up well, nor will the Plants rais'd in the Spring be forward enough to produce ripe Seeds.

COMPARTIMENTS, are Beds, Plats, Borders, and Walks, laid out according to the Form of the Ground and Ingenuity of the Artist, and depend more on a good Fancy than any Rules : Or, are Diversities, or Knots of Flower-Gardens, or Parterres, of which there are great Variety, and may be diversify'd infinitely, according to the Fancy of the Designer.

Plain COMPARTIMENTS, are Pieces of Ground divided into equal Squares and Flower-Beds, mark'd out by the Line, of equal Length and Breadth.

Some Persons allow to these Squares Borders of two Feet in Breadth, and not more if the Plat of Ground be small ; but if they be reasonably large, three Feet ; and they edge the Borders with Box, or upright hardy Thyme, or some other Aromatick Herbs or Flowers, for the Sake of the greater Neatness.

And in order to preserve the Paths and Allies of Compartments firm, even and durable, they

they lay them with a Coat of Sand or Gravel two or three Inches thick, keeping them hoed and weeded as often as there shall be Occasion.

COMPOSTS, [are so call'd, of *Composta*, or *Composita*, Lat. Compounds, of *componere*, Lat. to compound or mix: And in Husbandry and Gardening, they signify several Sorts of Soils or Earthy Matter mix'd together, in order to make a Manure for assisting the natural Earth in the Work of Vegetation, by way of Amendment or Improvement.]

Composts are various, and ought to be different according to the different Nature or Quality of the Soils which they are design'd to meliorate, and according as the Land is either *light, sandy, or loose or heavy, clayey and cloddy*. A light, loose Land requires a *Compost* of a heavy Nature, as the Scouring of deep Ditches, Ponds, &c.

So, on the other hand, a Land that is *heavy, clayey or cloddy*, requires a *Compost* of a more sprightly and fiery Nature, that will insinuate itself into the lumpish Clods; which, if they were not thus manag'd, would very much obstruct the Work of Vegetation.

As a good *Compost* for *cold clayey Land*, some advise to take one Load of Sea sand, (if it can be conveniently had), or if not, other Sand, or sandy Ground, or sharp Sand, and two Loads of good rotten Dung, and three Loads of natural Mould, two Loads of the top Spit Turf from off the Meadows, or any other Kind of rich Turf Land, and half a Load of Coal-Ashes, or the Sweepings of Streets, a small Sprinkling of Pigeons, Sheep, or other hot Dungs. These are to be laid down in different Heaps in a Circle, having a large Space in the Centre, so that they may all be thrown up together in one Heap, which is to be done by as many Persons at each Heap, as there are different Loads in each, *viz.* one to that of one Load, two to that of two Loads, and three to that of three Loads, and so on; these must cast and spread at the same time every Parcel with Care, and not all together in Lumps.

The fittest Time for the doing of this, is when the Weather is dry, and also in the Month of *May*. This Mixture should be turn'd once a Month till *Michaelmas*, and then it may be screen'd, and separated into several Sorts, to be ready, as occasion shall require, in the Nursery.

For the first Sort, it will be best to set the Skreen more Upright; and what comes thro' may be mix'd with one-fourth part of Melon Earth very fine.

The second Sort may be screen'd with the Skreen standing more sloping; by which means, what comes through will be coarser than the first.

The Remainder, which will be the roughest and most cloddy Earth, is recommended as an extraordinary Manure to be dug in order to improve any barren or poor Land; and if it be kept in a Heap for one Year, and skreen'd the next Year, 'twill then be as good as either of the former. The finest of these will be

best kept in a House, or under some Covering, that it may be dry; tho' it would be better to be turn'd out sometimes to get Rain.

A *Compost* for a *loose sandy Ground* may be made, by taking two Loads of Dung, three Loads of natural Soil, three Loads of strong Loamy Earth, three Loads of Pond Earth, or of the Scouring of Ditches, which are to be order'd, mix'd and skreen'd as before; and so to make three different Sorts of Skreenings.

Others recommend other *Composts* differing according to the different Soils.

For a *stiff Soil* inclining to *Clay*, To take five Loads of the same Soil well broken and open'd, and to add to that five Loads more of Heath Turfs burnt; that these having been well mix'd and laid together during the Winter in a Heap or Ridge, and being well sifted or skreen'd, are recommended as a good *Compost* that will extremely forward Trees.

2. To mix four Loads of sharp Sand, and two Loads of Ashes of burnt Furzes, Gorz, Fern, Weeds, or Wood, with four Loads of *stiff Soil* well broken and open'd: That these having been well mix'd together and laid up in a Ridge in *September*, should lie till the *February* following, and then may be skreen'd and sifted for Use. Sir *William Bruce* is said to have us'd this *Compost* in his Garden with good Success.

3. For a *stiff Soil*, Take four Loads of the stiff Soil, two Loads of rotten Wood, such as may be found under a Wood Pile, or the same Quantity of rotted Leaves, if the former can't be had, two Loads of burnt Grass-Turf, and four Loads of Sand: This is recommended to be done in *October* likewise; because being then made, and sifted in the following *Spring*, 'twill be better than if they were made in the *Spring*; for that the Heat of the *Summer* would exhale the volatile Spirits, and if they were not laid in some shady Place under Trees, the Weeds would exhaust good part of the Nourishment that is in them. These being mix'd well, and laid in a Ridge till *February*, and then sifted, is recommended as a good *Compost*.

4. Take two Loads of stiff Soil, two Loads of Rape-seed after the Oyl has been press'd out, four Loads of Sand, and two Loads of Burnt Heath or Grass Turf, and prepare them as the others, and sift them: And this *Compost* is recommended as one that will forward any Plant.

5. Take four Loads of stiff Soil, two Loads of Malt Grains after Brewing, and four Loads of Sand; these being prepar'd as before, are recommended as a *Compost* that will hasten the Growth of Plants.

6. Take of Sheeps-Dung and Wood-Ashes equal Quantities; of Loam or Mother-Earth double the Quantity: Prepare them as before directed, and they will prove a good *Compost*.

7. Take four Loads of stiff Earth, four Loads of Sand, four Loads of Horse-Dung well consum'd, and two Loads of Turf-Ashes: Prepare this Mixture as before directed.

The other *Compositions* which are proper for particular Plants, or choice Flowers, being exhibited in the several Articles where those Plants are treated of, I shall not repeat them

them in this Place, but refer the Reader thereto.

COMPOUND FLOWERS, are such as consist of many Florets or Semi-florets, or both together, which make up what is commonly call'd one whole Flower.

CONE: A Cone is a hard dry Seed-Vessel of a conical Figure, consisting of several Woody Parts (and is for the most part scaly) adhering closely together, and separating when ripe.

CONIFEROUS TREES, are such as bear Cones; as, the Cedar of Lebanon, Fir, Pine, &c.

CONSOLIDA Major; vide *Symphytum*.

CONSOLIDA Media; vide *Bugula*.

CONSOLIDA MINIMA; vide *Bellis*.

CONSOLIDA Regalis; vide *Delphinium*.

CONVOLVULUS, [of *Convolvendo*, Lat. rolling round, or wrapping or winding about.] Bindweed.

The Characters are;

It hath, for the most part, trailing Stalks: The Leaves grow alternately upon the Branches: And the whole Plant, for the most part, abounds with a Milky Juice: The Flower consists of one entire Leaf, shap'd like a Bell, whose Mouth or Brim is, for the most part, widely spread and expanded: The Ovary becomes a roundish membranous Fruit, which is, for the most part, wrapp'd up within the Flower-cup; and is, generally, divided into three Cells, each containing one angular Seed.

The Species are;

1. **CONVOLVULUS**; *vulgaris*, *major albus*. Mor. Hist. The common great white Bindweed, vulgarly call'd Bear-bind.

2. **CONVOLVULUS**; *minor*, *arvensis*, *flore roseo*. C. B. Lesser field Bindweed, with a Rose-colour'd Flower, vulgarly call'd Gravel Bind.

3. **CONVOLVULUS**; *maritimus*, *nostras*, *rotundifolius*. Mor. Hist. Common Sea Bindweed with round Leaves, or Soldanella Officin.

4. **CONVOLVULUS**; *marinus* *Calbaticus*, *folio rotundo*, *flore purpureo*. Plum. American purging Sea Bindweed, with a round Leaf, and a purple Flower.

5. **CONVOLVULUS**; *purpureus*, *folio subrotundo*. C. B. Indian *Convolvulus*, with roundish Leaves, and purple Flowers.

6. **CONVOLVULUS**; *Indicus*, *flore albo*. H. R. Par. Indian Bindweed, with white Flowers.

7. **CONVOLVULUS**; *Indicus*, *flore albo-purpurascens*, *femine albo*. H. R. Monf. Indian Bindweed, with whitish-purple Flowers, and white Seeds.

8. **CONVOLVULUS**; *Indicus*, *flore amplo roseo*. Indian Bindweed, with large Rose-colour'd Flowers.

9. **CONVOLVULUS**; *caeruleus*, *bederaceus*, *feu trifolius*. Park. Ivy-leav'd Indian Bindweed, with fair blue Flowers.

10. **CONVOLVULUS**; *Canariensis*, *sempervirens*, *folio molli incano*, *flore ex albo purpurascens*, *H. A.* Perennial Canary Bindweed, with soft hoary Leaves, and whitish-purple Flowers.

11. **CONVOLVULUS**; *major*, *heptaphyllus*, *flore sulphureo odorato speciosissimo*. Sloan. Cat. Jam. Great American Bindweed, with specious yellow sweet-scented Flowers, commonly call'd Spanish Arbor-Vine, or Spanish Wood-bind.

12. **CONVOLVULUS**; *Americanus*, *folio bederae*, *flore coccineo minore*. American Bindweed, with Ivy Leaves, and small scarlet Flowers. This is the *Quamoclit*, *Americana*, *folio bederae*, *flore coccineo*, of Commeline's rare Plants.

13. **CONVOLVULUS**; *Lusitanicus*, *flore cyaneo*. Broff. Portugal Bindweed, with fine blue Flowers, vulgarly call'd *Convolvulus Minor*.

14. **CONVOLVULUS**; *Lusitanicus* *flore & femine albo*. Boerb. Ind. alt. Portugal Bindweed, with white Flowers and Seeds, vulgarly call'd *Convolvulus minor flore albo*.

15. **CONVOLVULUS**; *major*, *reclus*, *Creticus*, *argenteus*. Mor. Hist. Great upright Bindweed from Crete, with Silver-colour'd Leaves.

16. **CONVOLVULUS**; *linariae folio*, *assurgens*. Tourn. Upright Bindweed, with Toad-flax Leaves.

The first of these Species is a very troublesome Weed in Gardens, especially under Hedges, or amongst the Roots of Trees, where, by its creeping Roots, it increases very fast; and the Plant twisting itself about whatever Plants, &c. are near it, will spread as far above-ground, over-bearing whatever Plant it comes near. The only Remedy that I know of to destroy this Plant, is by often hoeing of it down; which in one Year's Time (if carefully perform'd, and often repeated) will intirely destroy it: For the whole Plant abounds with a milky Juice; and whenever the Top is cut off, it is very subject to emit so great a Quantity of its Juice, as to destroy the whole Branch to the Top; which (as the Gardeners express it) is *bleeding to Death*.

The second sort, of which there are great Varieties of different-colour'd Flowers, is still a worse Weed than the former; for the Roots of this Kind do insinuate themselves into the Gravel many Feet deep, and greatly increase under-ground, rising and spreading its Branches over every thing near it. This I know no other Method to destroy, than Hoeing often, or pulling it up by Hand; which will, in Time, weaken and subdue it: But this can't be done under three or four Years, if attended with all possible Care, (especially in a dry, sandy, or gravelly Soil): But in a wet Soil it is soon destroy'd; for the Roots are very subject to rot with too much Moisture in Winter.

The third sort is found in plenty upon the gravelly or sandy Shores where the salt Water overflows in many Parts of England. This is a strong Purger, and as such is often us'd in Medicine. This Plant, if sown in a Garden, will seldom last above a Year or two.

The fourth Sort is found in great Plenty upon the Sea-shores of America, and is by the Inhabitants us'd as a Purge. The Seeds of this

this Plant was brought from the *Bahama Islands* by Mr. *Catesby*, and hath been rais'd in several Gardens in *England*; but it is very tender, and not to be kept through a Winter without a Stove.

The fifth, sixth, seventh, eighth, and ninth Sorts are annual, and are propagated in Gardens for the Beauty of their Flowers: These are commonly sown on a Hot-bed in *March*, and afterwards transplanted into Borders in the open Air, where being supported by tall Stakes, they will twist round them, and arise to a great Height, producing great Quantities of fine large Bell-shap'd Flowers, and will continue flowering until the Frost prevent them.

The semay all be rais'd in the open Ground, except the ninth, which if it is not brought forward in the Spring by a Hot-bed, seldom produces ripe Seeds; the rest are very hardy, and may be sown to cover Seats, Arbours, Palliados, &c. which they will do in a short Time, and continue very handsome until the Frost destroys them: The several Varieties, when intermix'd, make a beautiful Appearance, but the ninth Sort is by far the most beautiful of them all.

The tenth Sort is an abiding Plant, and requires a Green-house in Winter: This will grow to a considerable Height, and must be supported by strong Stakes: It flowers almost every Year with us, but seldom produces good Seeds in *England*. This may be propagated by laying down the tender Branches in the Spring, which by Autumn will have sufficient Roots to be taken off. These must be planted in Pots fill'd with fresh light Earth, and shelter'd from Frosts in Winter, but must have as much free Air as possible in mild Weather, and require frequent Waterings.

The eleventh Sort is very common in the hotter Parts of *America*, where it is known by the Name of *Spanish Arbor Vine*: It is by the Inhabitants planted to cover Arbors and Seats, for which Purpose it is very proper; for in those Countries one of these Plants will grow to the Length of sixty or a hundred Feet, and produce great Quantities of Side-branches, by which Means, in a very short Time, it will cover a large Seat: This Plant produces in *America* great Quantities of large fragrant yellow Flowers, which are each of them succeeded by three large angular Seeds. It is a very tender Plant with us, and can't be preserv'd but in warm Stoves through the Winter, nor hath it as yet produc'd any Flowers in *England* that I know of: It rises easily from the Seeds, if they are sown in a Hot-bed, and will grow to a great Length in one Summer; and altho' I have sometimes preserv'd it for two Years, and the Plant has spread to a great Length, yet I could never perceive any Attempt to flower.

The twelfth Sort is an annual Plant, and must be rais'd and manag'd, as was directed for the fifth, sixth, &c. This produces small Scarlet Flowers with a long Tube; which occasion'd Monsr. *Tournefort* to range it amongst the *Quamoclitis*. This Plant is in great Plenty in *Carolina*.

The thirteenth and fourteenth Sorts are also Annuals; but these do not climb as the others: The Seeds of these Plants may be sown in open Borders in *March*, where they will come up very well, and may be afterwards transplanted to a greater Distance, to adorn the Borders of a Pleasure-Garden. These Plants trail upon the Ground, if they are not supported, and do produce their beautiful Flowers thro' most of the Summer Months.

The fifteenth Sort is an abiding Plant, which with us doth grow upright to be three or four Feet high; the Branches are set very thick, with long narrow Silver-colour'd Leaves, and the Flowers grow upon the Tops of the Branches in an Umbel. These Flowers are sometimes succeeded by angular Seeds like the other Kinds: It may be propagated by planting Cuttings in any of the Summer Months, observing to water and shade them until they have taken Root; at which Time they must be planted in Pots fill'd with fresh sandy Soil, and must be shelter'd in Winter from the Frosts, but require open free Air at all Times when the Weather is mild.

The sixteenth Sort is a perennial Plant, which increases greatly by its creeping Roots: This grows erect about eight or ten Inches high, and produces Flowers somewhat like those of our lesser wild Kind, but seldom produces good Seeds with us; but the Plant may be abundantly multiplied by parting the Roots: It is very hardy, and loves a light Soil.

CONYZA; [of *κωνία*, Gr. a Flea; because the Leaves being hung up, drive away Fleas, as *Dioscorides* says: It is also call'd *Baccharis*, of *Bacchus*; because it breathes out a viscous Scent.] Flea-bane.

The Characters are;

It hath undivided Leaves, which, for the most part, are glutinous, and have a strong Scent: The Cup of the Flower is, for the most part, scaly, and of a cylindrical Form: The Flower is compos'd of many Florets, which are succeeded by Seeds which have a downy Substance adhering to them.

The Species are;

1. **CONYZA**; *major, vulgaris*. C. B. Common Great Flea-bane.

2. **CONYZA**; *minor, flore globofo*. C. B. Lesser Flea-bane, with globular Flowers.

3. **CONYZA**; *Americana, Lamii folio*. Tourn. American Flea-bane, with Leaves of the Dead Nettle.

4. **CONYZA**; *mas, Theophrasti, major Dioscoridis*. C. B. The Greater Flea-bane of *Dioscoridis*.

5. **CONYZA**; *Cretica, fruticosa, folio molli, candidissimo & tomentoso*. Flor. Shrubby Flea-bane from *Crete*, with soft downy white Leaves.

There are several other Species of these Plants, which are preserv'd in the curious Botanic Gardens; but as they are Plants of little Use or Beauty, I shall omit mentioning of them here.

The first of these Species is found wild upon dry chalky Hills in divers Parts of *England*,

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and is seldom cultivated in Gardens: It is a biennial Plant, being sown in the Spring: It flowers the second Year, and after producing Seeds it decays.

The second Sort grows on boggy Places, or where the Water has stood all the Winter, in many Parts of *England*: It may be propagated in a Garden by sowing the Seeds soon after they are ripe. This Plant is an Annual, and never continues above one Year. This is the Species which is sometimes us'd in Medicine.

The third Sort is very common in *Barbadoes*, and many other Parts of *America*; it very often comes up in great Plenty in the Earth that is brought from thence. This is an annual Plant, and must be sown in a Hot-bed, and managed as hath been directed for the *Balsamina*, to which I refer the Reader.

The fourth Sort is said to grow in great Plenty about *Montpelier*: This is somewhat like the first Sort, and may be propagated by sowing the Seeds soon after they are ripe, which will flower the succeeding Summer, and after perfecting its Seeds decays.

The fifth Sort is an abiding Plant, which with us seldom rises above eighteen Inches high, but hath woody Branches; the Leaves are very white and soft, which renders them very agreeable when intermix'd with different colour'd Plants in large Borders; but the Flowers have no great Beauty in them. This Plant is very hardy, and will endure our severest Cold in the open Borders, and may be propagated by planting Cuttings in any of the Summer Months.

CONSERVATORY; *vide* Green-house.

CONVAL-LILY; *vide* Likum Conval-lum.

CORALLODENDRON; of *Kydder*, *Coral*; and *Wider*, *Gr. a Tree*.] The Coral-tree.

The Characters are;

It hath the Appearance of a Tree: The Leaves, for the most part, consist of three Lobes: The Flowers are papilionaceous: The Standard (or Vexillum) is long, and shap'd like a Sword: The Wings on each Side, and the Keel (or Carina) are very short: The Flowers are succeeded by knobbed bivalve Pods, which contain several Kidney-shap'd Seeds.

The Species are;

1. CORALLODENDRON; *tryphillon, Americanum, spinosum, flore ruberrimo. Tourn.* The Three-leav'd American Coral-tree, with deep red Flowers, commonly call'd in *America* the Bean-tree.

2. CORALLODENDRON; *Americanum, non spinosum, foliis magis acuminatis flore longiore: An, Coral arbor non spinosa, flore longiore & magis clauso. Sloan. Cat. Fam.* American Coral-tree without Spines, having sharp-pointed Leaves and long Flowers.

3. CORALLODENDRON; *Carolinianum, floribus spicatis coccineis ramis crassissimis.* Thick-rooted Carolina Coral-tree, with Scarlet Flowers growing in Spikes.

The first and second Species do grow with us

to be eight or ten Feet high, with strong woody Stems, and produce very beautiful Scarlet Flowers, but never produce any Seeds in the *European* Gardens, as I can hear of. They may be rais'd by sowing their Seeds, which are brought from *America*, in a Hot-bed in the Spring of the Year, which will very easily come up: The young Plants should, when they are five or six Inches high, be carefully transplanted into Pots of light fresh Earth, and plung'd into a Hot-bed, observing to shade them from the Heat of the Sun, until they have taken fresh Root; after which they should have Air given them, by raising up the Glasses in the Day-time when the Weather is warm; and in *July* and *August*, they should have a greater Share of Air, in order to harden them before Winter; and in *September*, they should be remov'd into the Stove, and during the Winter-season should have but little Water given them, for they commonly cast their Leaves in Winter, and push them out fresh the succeeding Spring.

These Plants may also be propagated by planting Cuttings in any of the Summer Months, which should be put into Pots fill'd with fresh light Earth, and plung'd into a moderate Hot-bed of Tanner's Bark, observing to shade the Glasses in the Heat of the Day, and to give them gentle Refreshings with Water, as the Earth in the Pots is found to dry. In two Months time these Cuttings will have sufficient Roots to transplant; at which time they must be put each into a single Pot, and plung'd again into the Hot-bed, and managed as was directed for the Seedling Plants.

In four or five Years Time these Plants will produce Flowers, if they are preserv'd in a moderate Warmth all the Winter; for if they are kept too warm, they are subject to grow all the Winter, and the Shoots will be thereby drawn too weak to produce Flowers; and if they are kept too cold, they are liable to lose their tender Buds which should produce the Flowers: Therefore if they are kept up to the temperate Point mark'd on Mr. *Fowler's* Thermometer during the Winter Season, they will succeed very well.

The third Sort was rais'd from Seeds which were sent from *Carolina* by Mr. *Catesby*, Anno 1724. This Plant seldom rises above three Feet high with us, and hath large knobbed Roots; the Flowers are produc'd in Spikes upon the Branches, in the Summer Season, when the Plant is almost destitute of Leaves, but never produces ripe Seeds with us.

This Plant is somewhat harder than the other two Species, and may be kept in a lesser Degree of Heat in Winter, and be expos'd to the open Air during the Months of *June*, *July* and *August*. I have not been able yet to propagate this Plant by Cuttings, but there is no Doubt of its succeeding as well as the other two Sorts.

CORCHORUS; Jews Mallow.

The Characters are;

The Leaves are produced alternately at the Joints of the Stalks: The Cup of the Flower consists

consists of five Leaves : The Flower hath five Leaves, which expand in Form of a Rose : The Pointal of the Flower becomes a cylindrical Fruit, which is divided into five Cells which are fill'd with angular Seeds.

The Species are ;

1. CORCHORUS ; five Melochia. J. B. Common Jews Mallow.

2. CORCHORUS ; Americana, Carpini foliis, sextuplasi capsulâ praelongâ. Pluk. American Jews Mallow, with Leaves like the Hornbeam, with long Pods.

3. CORCHORUS ; Americana praelongis foliis, capsulâ striatâ subrotundâ brevi. Pluk. American Jews Mallow, with long Leaves and short roundish furrow'd Pods.

4. CORCHORUS ; Orientalis, brevioribus foliis, flore flavo, fructu Caryophylloide longiori. Pluk. Eastern Jews Mallow, with short Leaves and long Pods shap'd like a Clove.

The first Species, Rauwolf says, is sown in great Plenty about Aleppo as a Pot-herb ; the Jews boiling the Leaves of this Plant to eat with their Meat : This he supposes to be the *Olus Judaicum* of Avicenna, and the *Corchorum* of Piny.

The Varieties of this Plant are preserv'd in curious Botanick Gardens to add to their Number of Plants, but it being of no great Beauty or Use with us, is seldom propagated in other Gardens.

They are all of them Annual, and must be sown on a Hot-bed early in the Spring, and afterward treated as the Female *Balsamine* ; to which I shall refer the Reader for their Culture. They delight in a rich Soil, and must have frequent Waterings in dry Weather.

Their Flowers are produced in June and July, and their Seeds ripen in September.

CORIANDRUM ; [*Korandron*, of Roem, Gr. a Wood-louse ; so called, either because it has the Scent of this Insect, or, as others say, because it drives away or kills them ; and *Ardele*, Gr. the Isle where it grew plentifully.] Coriander.

The Characters are ;

It hath a fibrose annual Root : The lower Leaves are broad, but the upper Leaves are deeply cut into five Segments : The Petals of the Flower are unequal, and shap'd like a Heart : The Fruit is compos'd of two hemispherical (and sometimes spherical) Seeds.

The Species are ;

1. CORIANDRUM ; majus. C. B. Greater Coriander.

2. CORIANDRUM ; minus, testiculatum. C. B. Smaller testiculated Coriander.

3. CORIANDRUM ; sylvestre, fetidissimum. C. B.

The first of these Species is the most common Kind, which is cultivated in the European Gardens and Fields for the Seeds, which are us'd in Medicine. The second Sort is less common than the first, and is seldom found but in Botanick Gardens in these Parts of Europe. The third Sort, as mention'd in Caspar Bauhin's *Pinax*, and cited by the learned Boerhaave, in his Catalogue of the

Leyden Garden, is so like the first, that I could find no Difference between them when compar'd together, though I receiv'd the Seeds of this Kind from the Leyden Garden.

These Plants are propagated by sowing their Seeds early in the Spring, in an open Situation in a Bed of good fresh Earth ; and when the Plants are come up, they should be hoed out to about four Inches Distance every Way clearing them from Weeds ; by which Management these Plants will grow strong, and produce a greater Quantity of good Seeds.

CORINDUM ; [of *Cer* the Heart, because this Seed has a bright Spot resembling a Heart ; and *Indum*, because it is brought from India. This Plant is said to be a very high Cardiac. It is also call'd *Halicacabus*, of *κακαβος* a Vessel, because the Fruit of this Plant resembles a Kettle.] Heart-Peas.

The Characters are ;

It hath a trailing Stalk, emitting Claspers whereby it fastens it self to whatever Plant it stands near : The Calyx (or Flower-cup) consists of three Leaves : The Flowers consist of eight Leaves, and are of an anomalous Figure : The Ovary becomes a Fruit which is like a Bladder, and divided into three Cells in which are contain'd round Seeds in Form of Peas, of a black Colour, having the Figure of a Heart of a white Colour upon each.

The Species are ;

1. CORINDUM ; folio ampliori, fructu majore. Tourn. Heart-Pea, with large Leaves and Fruit.

2. CORINDUM ; folio & fructu minore. Tourn. Heart-pea, with small Leaves and Fruit, call'd by the Inhabitants of the West Indies, Wild Parsley.

3. CORINDUM ; folio amplissimo, fructu minore. Heart-pea, with very large Leaves, and small Fruit.

These Plants are very common in Jamaica, Barbadoes, and most of the other warm Islands in the West Indies, where their Seeds are scatter'd and become Weeds all over the Country.

They may be cultivated in England, by sowing their Seeds on a Hot-bed in March ; and when the Plants come up, they must be transplanted into a fresh Hot-bed, where they may remain until the Middle of May ; at which Time they may be transplanted into Pots or Borders, and expos'd to the open Air. These Plants will require Sticks to support them ; otherwise their Branches will trail upon the Ground, and be apt to rot, (especially in a wet Season.) There is no great Beauty in this Plant ; it is chiefly preserved as a Rarity in the Gardens of the Curious. It produces its Flowers in June, and the Seeds are perfected in August.

CORK-TREE ; vide *Suber*.

CORN-FLAG ; vide *Gladiolus*.

CORNICULATE PLANTS, [*Plantæ Corniculatæ*, or such as after each Flower produce

produce many distant horned Seed-pods, call'd *Siliquæ*.

CORN-MARYGOLD ; *vide* *Chrysanthemum*.

CORN-SALAD ; *vide* *Valerianella*.

CORNUS, [is so call'd, of *Cornu*, Lat. a *Horn* ; because its Wood, or the Office of its Fruit, is hard as a Horn. This Tree was anciently dedicated to *Apollo*, because Bows were made of it for him.] The Cornelian Cherry.

The Characters are ;

The Calyx (or Flower-Cup) consists of four small rigid Leaves, which are expanded in Form of a Cross ; from the Centre of which are produced many small yellowish Flowers, each consisting of four Leaves, which are disposed almost in Form of an Umbrella. These Flowers are succeeded by Fruit, which are oblong, or of a cylindrical Form, somewhat like an Olive, containing a hard Stone, which is divided into two Cells, each containing a single Seed.

The Species are ;

1. **CORNUS** ; *bortensis, mas.* C. B. The Cornelian-Cherry, or Male Cornel-Tree.
2. **CORNUS** ; *femina.* C. B. The Dogberry, or Gatten-tree.
3. **CORNUS** ; *femina, foliis variegatis.* H. L. The strip'd Dogberry-Tree.
4. **CORNUS** ; *femina, Laurifolia, fructu nigro cæruleo, officulo compresso, Virginiana.* Pluk. Alm. The Virginian Dogberry-Tree.
5. **CORNUS** ; *mas, odorata, folio trifido, margini plano, Sassafras dicta.* Pluk. Alm. The Sassafras-Tree.

The first of these Trees is very common in the English Gardens, being propagated for its Fruit ; which is by many People preserv'd, to make Tarts : It is also used in Medicine as an Astringent, and Cooler. There is also an Official Preparation of this Fruit, call'd *Rob de Cornis*.

The second Sort is very common in the Hedges in divers Parts of England, and is seldom preserv'd in Gardens. The Fruit of this Plant is often brought into the Markets, and sold for *Buckthorn-Berries* ; from which it may be easily distinguished, if the Berries are opened to observe how many Stones there are in each, which in this Fruit is but one, but in the *Buckthorn* four.

The third is also a Variety of the second, and is preserv'd, for its variegated Leaves, in several curious Gardens.

The fourth Sort is at present pretty rare in England : It is brought from *Virginia* and *Carolina*, where it grows in great Plenty.

The fifth Sort is also a Native of *America*, and is rarely found in the European Gardens. The Root of this Tree is much used in England, to make a Tea which is greatly commended by some against violent *Defluxions*.

The first, second, and third Species are propagated by laying down their tender Branches, which in one Year's Time will take sufficient Root to be transplanted ; at which Time they may be either planted in a Nursery, or in the Places where they are to remain. During the

two first Years, Care should be taken to train their Stems upright ; otherwise they are very subject to shoot crooked, and appear unsightly : But when they are grown up to a regular Size, they should not be pruned, especially if you would have Plenty of Fruit.

These Trees commonly rise with us to be eight or ten Feet high, or more, and are proper to intermix with Trees of the same Growth in smaller Quarters of Trees and Shrubs, where they will add to the Variety ; and if they are not too much crowded with other Trees, will produce large Quantities of Fruit.

The fourth Sort may be also propagated by Layers ; but must have a good Soil, and a Situation which is well defended from the North and East Winds, and loves to grow in the Shelter of other Trees. This may be also rais'd from Seeds, which should be sown soon after they are ripe, and shelter'd from severe Frosts under a Frame : The second Spring after sowing, the Plants will come up, which must also be screen'd from severe Frosts while young, but afterwards they will endure our hardest Winters abroad.

The best Season for transplanting these Trees, is toward the Latter-end of *March*, or the Beginning of *April*, just before they begin to shoot ; observing to shade and water them (if the Weather should prove hot and dry) for about a Fortnight after removing ; as also to cover the Surface of the Ground with a little Mulch, to preserve the Earth from drying too fast : And if the Summer should prove very dry, it would be convenient to give them a little Water once a Week ; and after they are well rooted in the Ground, they will want little farther Care.

The *Sassafras* is one of the most difficult Trees to grow with us, that I know ; it will rarely live, if kept in Pots and preserv'd in a Green-house ; nor will it endure our open Air abroad : The best Culture that I can prescribe, is to remove it carefully in *April* into a good strong Soil, and in a Situation that is well defended by other Trees, both from the cold Winds and open Sun : but they must not stand under the Dropping of other Trees. In the Winter it will be proper to lay a little Mulch upon the Surface of the Ground round their Stems, to prevent the Frost from penetrating too deep into the Ground : but their Heads should by no means be cover'd ; which, tho' practis'd by some, yet I am sure doth more harm than good : In the Summer Season they must be kept clear from Weeds, &c. In this Management, I have seen the most promising Trees of this Kind.

These Trees are generally brought over from *Virginia* or *Carolina* to curious Persons, in both which Places they abound very much, and do propagate themselves by their creeping Roots ; as also their Berries, which fall to the Ground, and come up in great Plenty : But with us they are not so easily increas'd ; it being with great Difficulty procur'd by Layers, which are commonly two Years before they are furnish'd with Roots enough to transplant and

and is also with as much Difficulty remov'd. And the Berries which are brought from *America* seldom succeed with us: They are always two Years before they come up, and then make but a very small Advance for two or three Years after, and it is very rare that many of them are preserv'd so as to succeed.

The best Method of sowing the Seeds, is to put them into a Bed of fresh good Earth soon after the Seeds are ripe, in a Situation where they may have the Morning Sun until Eleven o' Clock; and in hard frosty Weather cover the Surface of the Ground with Litter: in such a Bed you may expect (if the Seeds were fresh) the Plants to come up the second Spring, which should also be cover'd with light Litter or Peas-haulm the first Winter, until they have Strength to resist the severe Cold of our Climate; after which Time, they must be treated as was before directed.

CORONA IMPERIALIS; [so call'd, because it bears Flowers crown'd with Leaves.] Crown Imperial.

The Characters are;

The Flowers consist of six Leaves, are Bell-shaped, and hang downwards: These are rang'd, as it were, into a Crown; above which appears a great Bunch of Leaves: The Pointal of the Flower becomes an oblong Fruit, which is wing'd, and divided into three Cells, which are fill'd with flat Seeds: To which may be added, it hath a coated Root, which is furnish'd with Fibres at the Bottom.

The Species are;

1. CORONA IMPERIALIS. *Dod.* The common Crown Imperial.
2. CORONA IMPERIALIS; *major Tourn.* The greater Crown Imperial.
3. CORONA IMPERIALIS; *flore pleno. Tourn.* Crown Imperial, with a double Flower.
4. CORONA IMPERIALIS; *duplici coronâ. Tourn.* Crown Imperial, with a double Crown.
5. CORONA IMPERIALIS; *triplici coronâ. H. L.* Crown Imperial, with a triple Crown.
6. CORONA IMPERIALIS; *multiflora, latouque caule. Tourn.* Crown Imperial, with many Flowers, and flat Stalks.
7. CORONA IMPERIALIS; *folio vario. Tourn.* Strip'd-leav'd Crown Imperial.
8. CORONA IMPERIALIS; *folio vario ex viridi & argenteo. Boerb. Ind.* Silver strip'd-leav'd Crown Imperial.
9. CORONA IMPERIALIS; *flore pulchrâ luteo. Tourn.* Crown Imperial, with a beautiful yellow Flower.
10. CORONA IMPERIALIS; *flore luteo pleno. Boerb. Ind.* Crown Imperial with a double yellow Flower.
11. CORONA IMPERIALIS; *flore luteo striato. Tourn.* Crown Imperial, with a yellow-strip'd Flower.
12. CORONA IMPERIALIS; *ramosa. Tourn.* Branch'd Crown Imperial.

There are some other Varieties of this Flower, which are preserv'd in the Gardens of curious Florists: but as they are only Variations which are accidentall, from Seeds of the same Plant, so their Numbers may be increas'd,

like many other bulbous Plants, by such who are curious in sowing and sowing Seeds of the different Varieties.

The manner of propagating this Plant from Seeds, being the same with the *Tulip*, I shall forth the Reader to that Article for the particular Directions, and shall proceed to the Method of cultivating their Roots already obtain'd, so as to have fair large Flowers.

The best Season for Transplanting their Roots is in *July* or *August*, before they push forth fresh Fibres; after which Time, it is not so safe to remove them: or they may be taken, up in *June*, when their green Leaves are quite decay'd; and may be kept out of the Ground until *August*, at which Time they should be planted in Beds or Borders of good fresh Earth, burying a little rotten Dung in the Bottom, so that the Fibres may strike into it: but be sure not to let it be near the Bulb, for it is apt to rot whenever this happens.

If they are planted in open Beds or Borders of a Pleasure-Garden, they should be plac'd exactly in the Middle, for they will rise to be three Feet high or more in a good Soil, and so would be improper to stand on the Side of a Border where should be planted Flowers of lower Growth.

In planting of these Roots, after the Border is mark'd out, and the Distances fix'd between each Root, (which should be eight or ten Feet or more, according to the Size of the Garden, and the Number of Roots to be planted) you should open a Hole with a small Spade about six Inches deep, into which you should place your Root, observing to set the Crown uppermost; and then with your Hand fill in the Earth round the Root, breaking the Clods, and removing all large Stones from about it, and afterwards level the Ground with your Spade, and rake the Border over after all the Roots are planted. Your Roots being thus planted will require no farther Care, as being very hardy; the Frost never injures them, but if the Ground is too wet in Winter, they will be apt to rot; therefore in such Cases, the Borders should be rais'd a Foot or more above the Level of the Ground. In *February* their Buds will appear above-ground, and if the Weather be mild, they will advance in Height very fast, and in *March* they will produce their Flowers; but as their Stems grow tall, and the Spring season being commonly windy, it will be very proper to support them with Sticks, to prevent their being broke down: Nor should the Flowers of this Plant be gather'd when blown, for it greatly weakens their Roots; so that they do not afford an Increase of Bulbs, and many times are two or three Years before they flower again.

These Roots should be transplanted every third Year, by which Time they will have furnish'd some Off-sets of considerable Strength, which must be taken from the old Roots; and such of them as are large enough to produce Flowers, may be planted in Borders with the old Roots, but the small ones should be planted in a Nursery-bed, where they may remain till they have Strength enough to flower; but if

you remove the Blowing Roots oftener, they will not flower so strong, nor will their Increase be near so great.

This Plant deserves a Place in the most curious Flower-Gardens, for the Earliness of its Flowering; it being the first Plant of large Growth that we have flowers, and so consequently garnishes the Crowns of Borders, at a Season when there are no other Flowers in the same Line appearing, and so begins that Order of Flowering, which should be succeeded by other Flowers of the like Growth, through the greatest part of the Season. Their Seeds are ripe about the Beginning of June, and should be sown in July. For the Manner of Performing it, see *Tulipa*.

CORONA SOLIS; The Sun-Flower.

The Characters are;

It hath a squamous Cup: The Flowers are radiated like the great Starwort: The Embryo's of the Seeds are distinguish'd by little imbricated Leaves in the Disk: The Top of the Ovary is crown'd with two small Leaves: The Seeds are push'd out from the Bottom of the Flower, leaving a Vacuity which appears very like a Honey-comb.

The Species are;

1. CORONA SOLIS. *Tab.* The Common great annual Sun-Flower.

2. CORONA SOLIS; *maxima, semine albo, cinereo & striato. Tourn.* Great Annual Sun-Flower, with Ash-colour'd strip'd Seeds.

3. CORONA SOLIS; *maxima, flore pallide sulphurea, fere albo, semine nigro. Boerb. Ind.* Great Annual Sun Flower, with pale Brimstone-colour'd Flowers, and black Seeds.

4. CORONA SOLIS; *maxima, flore pleno, aureo, semine nigro. Boerb. Ind.* Great Annual Sun-Flower with double yellow Flowers, and black Seeds.

5. CORONA SOLIS; *maxima, flore pleno, aureo, semine albo. Boerb. Ind.* Great Annual Sun-Flower with double yellow Flowers, and white Seeds.

6. CORONA SOLIS; *maxima, flore pleno sulphureo, semine nigro. Boerb. Ind.* Great Annual Sun-Flower, with double Brimstone-colour'd Flowers, and black Seeds.

7. CORONA SOLIS; *maxima, flore pleno, sulphureo, semine albo. Boerb. Ind.* Great Annual Sun-Flower, with double Brimstone-colour'd Flowers, and white Seeds.

8. CORONA SOLIS; *perennis & vulgaris. Vaill.* Common Perennial or Everlasting Sun-Flower; *vulgô.*

9. CORONA SOLIS; *foliis amplioribus lacinatis. Tourn.* Perennial Sun-flower, with large divided Leaves.

10. CORONA SOLIS; *foliis angustioribus lacinatis. Tourn.* Perennial Sun flower, with narrow divided Leaves.

11. CORONA SOLIS; *foliis asperis, tribus vel quaternis ad genicula sitis. Mor. Hist.* Rough-leav'd Perennial Sun-Flower, having three or four Leaves plac'd at each Joynt of the Stalk.

12. CORONA SOLIS; *Trachelii folio, radice repente Tourn.* Creeping-rooted Perennial Sun-flower, with a Throat-wort Leaf.

13. CORONA SOLIS; *altissima, Vosacensis. Vail.* The tallest Perennial Sun-flower, call'd Vosacan.

14. CORONA SOLIS; *altissima, Virgæ aureæ foliis Tourn.* Tallest Perennial Sun-flower, with Golden-Rod Leaves.

15. CORONA SOLIS; *salicis folio alato caule. Tourn.* Willow-leav'd Perennial Sun-Flower with winged Stalks.

16. CORONA SOLIS; *salicis folio latiore, caule alato, serotino.* Broader Willow-leav'd Perennial late flowering Sun-Flower, with winged Stalks.

17. CORONA SOLIS; *arborea, folio latissimo platani. Boerb. Ind.* Tree like Perennial Sun-Flower, with a broad Plane-Tree Leaf.

18. CORONA SOLIS; *parvo flore, tuberosâ radice. Tourn.* Tuberole-rooted Perennial Sun-Flower, with a small Flower, commonly call'd Jerusalem Artichoke.

I shall here beg Leave to add another Plant or two, which are very nearly ally'd to the Sun-Flower, but do in their distinctive Notes differ therefrom: but as they are not as yet absolutely fix'd by any of the Botanists to any particular Genus, so they will not come in improperly in this Place.

19. CHRYSANTHEMUM; *Helenii folio, umbone floris grandiusculo prominente. Pluk. Phyt.* Dwarf American Sun-Flower; *vulgô.*

2. CHRYSANTHEMUM; *Americanum, Doronici folio, flore Persici coloris, umbone magno prominente, ex atro purpureo, viridi & aureo fulgente. Pluk. Phyt.* Dwarf Peach'd-colour'd American Sun-Flower, with a Leaf like Leopards-bane.

All these Species of Sun-flowers are Natives of America, from whence we are often supply'd with new Kinds, it being a large Genus of Plants: And it is very remarkable, that there is not a single Species of this Genus that is European; so that before America was discover'd, we were wholly unacquainted with these Plants. But altho' they are not originally of our own Growth; yet are they become so familiar with our Climate, as to thrive and increase full as well as if they were at Home; (some of the very late Flowering Kinds, excepted, which require a longer Summer than we generally enjoy, to bring them to Perfection): and many of them are now so plentiful in England, that Persons unacquainted with the History of these Plants, would imagine them at least to have been Inhabitants of this Island many hundred Years; particularly the *Jerusalem Artichoke*, which tho' it doth not produce Seeds in our Climate, yet doth so multiply by its knobbed Roots, as when once well fix'd in a Garden, is not easily to be rooted out.

The first seven Sorts being Annuals, must be sown every Spring in a Bed of good light Earth; and when the Plants are come up about three Inches high, must be transplanted into Nursery-beds, at about eight or ten Inches Distance every way, where they may continue

until

until they are a Foot high, when they must be carefully taken up with a Ball of Earth, and transplanted into the Middle of large Borders, or intermix'd in Bosquets of large growing Plants, observing to water them until they are well rooted; after which Time they will require no farther Care but to clear them from Weeds.

In *July* the great Flowers upon the Tops of the Stems will appear; amongst which, the best and most double Flowers of each kind should be preserv'd for Seeds, for those which flower later upon the Side-branches are neither so fair, nor do they perfect their Seeds so well as those which are first in Flower: When the Flowers are quite faded, and the Seeds are form'd, you should carefully guard the Heads from the Sparrows, which will otherwise devour most of the good Seeds; and about the Beginning of *October*, when the Seeds are ripe, you should cut off the Heads with a small Part of the Stems, and hang them up in a dry airy Place for about a Month; by which Time the Seeds will be perfectly dry and hard, when you may easily rub them out, and put them up in Bags, or Papers, preserving them from Vermin until the Season for sowing them.

The other perennial Sorts rarely produce Seeds in *England*, but most of them do increase very fast at their Roots, especially the common and creeping-rooted Kinds. The eighth Sort, which is the most common in the *English* Gardens, is the largest and most valuable Flower, and is a very proper Furniture for large Borders in great Gardens, as also for Bosquets of large growing Plants, or to intermix in small Quarters with Shrubs, or in Walks under Trees where few other Plants will thrive: It is also a great Ornament to Gardens within the City; where it doth grow in Defiance of the Smoak better than most other Plants; and for its long Continuance in Flower, deserves a Place in most Gardens, for the Sake of its Flowers for Basons, &c. to adorn Halls and Chimnies in a Season when we are at a Loss for other Flowers. It begins flowering in *June*, and continues until *October*.

The 9th, 10th, 11th, 12th, 13th, 14th, 15th, and 16th Sorts may also have a Place in some abject Part of the Garden, for the Variety of their Flowers; which though not so fair as those of the common Sort, yet will add to the Diversity; and as many of them are late Flowerers, so we may continue the Succession of Flowers longer in the Season.

These Sorts are all of them very hardy, and will grow in almost any Soil or Situation: They are propagated by parting their Roots into small Heads, which in one Year's-time will spread and increase greatly. The best Season for this Work is in the Middle of *October*, soon after their Flowers are past; or very early in the Spring, that they may be well rooted before the Droughts come on, otherwise their Flowers will be few in Number, and not near so fair, and by this means their Roots will be weak; but if they are planted in *October* you will save the Trouble of watering them;

their Roots being surely fix'd before the dry Weather, they will need no other Trouble than to clear them from Weeds.

The *Jerusalem Artichoke* is propagated in many Gardens for the Roots, which are by some People as much esteem'd as *Potatoes*, but they are more watery and flashy, and are very subject to trouble the Belly by their windy Quality, which hath brought them almost into Disuse.

These are propagated by planting the smaller Roots, or the larger ones cut into Pieces, (observing to preserve a Bud to each separate Piece) either in the Spring or Autumn, allowing them a good Distance, for their Roots will greatly multiply; the Autumn following, when their Stems decay, the Roots may be taken up for Use. These should be planted in some remote Corner of the Garden, for they are very unsightly while growing, and their Roots are apt to over-run whatever grows near them, nor can they be easily destroy'd when they are once well fix'd in a Garden.

The 17th, 19th, and 20th Sorts are somewhat tenderer than any of the former, and do therefore require a better Situation, and a dry Soil. The seventeenth Sort seldom produces its Flowers fair with us, it being a very late Flowerer; and if the Autumn proves bad, doth not produce any Flowers: This will grow to be six, seven, or eight Feet high, and very strong, but there is no great Beauty in its Flowers, and so is rarely preserv'd except in *Botanick* Gardens. The nineteenth Sort seldom rises above three Feet high: The Flowers are produc'd singly on long Footstalks, and are of a bright yellow Colour with a large Umbone in the Middle, of a dark-purple Colour. These Flowers are of a long Duration, for I have observ'd a single Flower remain in Beauty upon the Plant near two Months, and these are succeeded by fresh ones from the same Plant, so that (provided the Weather prove mild, or the Plant be shelter'd from Frost) you may have a Supply of these Flowers from the same Plant upwards of five Months, *viz.* from *June* till *December*.

The twentieth Sort is not near so beautiful a Flower with us, though I have been inform'd, that in *America* it produces a noble bold Flower which is very beautiful. The Petals of this Flower are very long and narrow, and are reflected back quite to the Footstalk, so that the Beauty of the Flower is lost.

These three Sorts are propagated by parting their Roots in the Spring, or from Seeds sown on a Hot-bed at that Season; when they can be obtain'd good, which is but rarely produc'd in *England*: They are commonly preserv'd in Pots, and shelter'd in the Winter, but I find them hardy enough to resist our ordinary Cold, if planted in a light dry Soil, and an open Position.

CORONILLA; [This Plant is so call'd of *Corona* a Crown or Garland, q. d. a little Crown, &c. because it bears Husks at the End like a little Crown, or because it resembles the Garlands that Shepherds adorn'd their Sweet-hearts

hearts with: It is by some call'd *Colutea*.] Jointed-podded *Colutea*.

The Characters are;

It hath Leaves like those of the Scorpion-Sena: The Flowers are papilionaceous: The Pods are full of Joints, having one oblong swelling Seed in each Division.

The Species are;

1. CORONILLA; *argentea, Cretica. Tourn.* Silver-leav'd, jointed-podded *Colutea* of Candia.
2. CORONILLA; *maritima, glaucifolia. Tourn.* Maritime jointed-podded *Colutea*, with a Sea-green-Leaf.
3. CORONILLA; *herbacea, flore vario. Tourn.* Herbaceous jointed-podded *Colutea*, with a variable Flower.
4. CORONILLA; *Cretica, herbacea, flore parvo purpurecente. Tourn.* Candia herbaceous, jointed podded *Colutea*, with a small purplish Flower.
5. CORONILLA; *Zeylanica, argentea tota. Boerb. Ind.* Silver jointed-podded *Colutea* of Ceylon.
6. CORONILLA; *minima. Tourn.* The least jointed-podded *Colutea*.

The first and second Species grow with us to be small Shrubs about three or four Feet high, and are so nearly alike in all respects, so far as I have been able to examine them, that I could readily pronounce them the same, were it not that they have been by so many eminent Botanists distinguish'd for two absolutely different Plants; which if there are two such, I have as yet seen but one of them: I have indeed receiv'd Seeds of the two Sorts from different Persons Abroad; but when they came up, they prov'd the same, and this more than once; which causes me to suspect they are not different; for at different Seasons of the Year the same Plant appears different as to the Colour of their Leaves; which might at first lead a Person into the Mistake: and this has been follow'd by all that have since wrote thereof.

This Plant is propagated by sowing the Seeds in the Spring, either upon a gentle Hot-bed or on a warm Border of light fresh Earth; and when the Plants are come up about two Inches high, they should be transplanted either into Pots, or in a Bed of good rich Earth, at about four or five Inches Distance every way, where they may remain until they have obtain'd Strength enough to plant out for good, which should be either into Pots fill'd with good fresh Earth, or in a warm situated Border; in which, if the Winter is not too severe, they will abide very well, and in the Spring following will produce large Quantities of yellow Flowers of a strong sweet Smell; which will be succeeded by long slender-jointed Pods in great Plenty, in which are contain'd the Seeds.

The third Sort dies down every Winter, but rises again the succeeding Spring, and produces large trailing Branches, which are furnish'd with great Numbers of variable-colour'd Flowers, which grow in Bunches; these are sometimes succeeded by small-jointed Pods, containing many oblong Seeds: but the Root creeps very far underground, by which the Plant increases

greatly; which when permitted to remain unremov'd for two or three Years, will spread and over-bear whatever Plants grow near it; for which Reason the Roots should be confin'd; and it should be planted at a Distance from any other Plants: It will grow in almost any Soil and Situation, but thrives best in a warm Sunny Exposure, in which the Flowers will also be much fairer, and in greater Quantities.

The fourth Sort is Annual, and must be sown every Spring in an open Bed or Border of good light Earth, in the Places where it is to remain; for it doth not very well bear removing. This is a Plant of little Beauty, and is only preserv'd in curious Gardens of Plants.

The fifth Sort is very tender, being a Native of Ceylon: This must be sown on a Hot-bed early in the Spring; and when the Plants are come up, they must be transplanted into small Pots fill'd with light Sandy Earth, and plung'd into a fresh Hot-bed of Tanners Bark; observing to give them frequent gentle Waterings: and as the Weather is hot or cold, so they must have more or less Air in Proportion thereto, by raising up the Glasses in the middle of the Day, but in the Nights the Glasses should be cover'd with Mats.

And when the Plants have grown so as to fill the Pots with their Roots, they must be carefully shaken out of them, preserving the Earth to their Roots; and after having pared off the Outside of the Ball of Earth, put them into Pots a Size bigger than those were which they came out of, filling up the Pot with the same light fresh Sandy Earth as before; then plunge the Pots again into the Hot-bed, and manage them as before. In the Winter they must be plac'd in a warm Bark-Stove amongst Plants of the tenderest Class, observing to refresh them frequently with Water which has stood in the same Stove at least eight or ten Hours before, that the Cold may be taken off: but never give them too much at a time: In this Management I have had this Plant succeed very well for two or three Years; but I have not as yet seen it flower in England, tho' there are Plants of this Kind in three or four Gardens, which are two or three Years old.

The sixth Sort is a very small Plant, and hath very little Beauty in it; this is preserv'd by the Curious in Botany, but is seldom found in Gardens of Pleasure, where few Plants are admitted that are not either beautiful or rare; and it is propagated by sowing of the Seeds in the Spring, on a Bed of fresh light Earth in a warm Position: And when the Plants are come up, they must be either transplanted into Pots fill'd with the same fresh Earth, or into warm Borders under a South or West Wall; for they are subject to be destroy'd by severe Frosts: and therefore those which are planted in Pots should be shelter'd during the Winter-season under a common Hot-bed Frame, taking off the Glasses in mild Weather, that they may enjoy as much of the free open Air as possible; and in the Spring, after the Cold is past, they may be shaken out of the Pots, and planted in a warm Border, where they will flower and produce ripe Seeds the succeeding Summer.

CORO-

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CORONOPUS; [*Kopov* *βλάστης*, of *Kopov* a Crow, and *βλάστης* a Foot; because the Leaves are said to resemble the Foot of a Crow, or because the Leaves resemble a Stag's Horn.] Buck's-horn Plantain.

The Characters are;

It agrees in Flower and Fruit with the Plantain, from which it differs in its Leaves, which are deeply cut in on the Edges; whereas the Leaves of Plantain are either intire, or but slightly indented.

The Species are;

1. **CORONOPUS**; *bortensis*. C. B. Garden Buck's-horn Plantain, or Hart's-horn; *vulg.*
2. **CORONOPUS**; *Massiliensis*, *birsutior latifolius*. *Tourn.* Broad-leav'd hairy Buck's-horn Plantain of *Marfeilles*.
3. **CORONOPUS**; *Neapolitanus*, *tenuifolius*. *Col.* Narrow-leav'd Buck's-horn Plantain of *Naples*.
4. **CORONOPUS**; *maritimus*, *roseus*. *Bocc. Rar. Pl.* Rose-like Sea Buck's-horn Plantain.

The first of these Species, tho' intitled a Garden Plant, yet is found wild in most Parts of *England*, and is the very same Plant which grows upon most Commons and barren Heaths, where, from the Poorness of the Soil, it appears to be very different from the Garden Kind, as being little more than a fourth Part so large. But this Plant, when transplanted or sown in a Garden by the other, grows to be full as large. Nor can I see any Difference between these, and that which grows upon the Sea-Coasts; tho' *Casper Baubin*, and many Botanists after him, make them distinct Species: But when they are all cultivated together in the same Soil, I am satisfy'd that no one Person can distinguish them, therefore I make no doubt of calling them all the same Plant.

This Species was formerly cultivated in Gardens as a Sallad-Herb; but at present is little regarded, and almost wholly disused: It may be easily cultivated by sowing the Seeds in the Spring upon any Soil, or in any Situation, it being extremely hardy; and when it comes up, it may be thinned out and suffered to remain for Use at about three or four Inches Distance, where the Leaves may be often cut for the Purposes above mentioned, the Roots still putting forth fresh Leaves; and if it is not suffered to seed, the Roots will remain two or three Years: but it seldom continues long after perfecting its Seeds. If the Seeds are suffered to fall upon the Ground, there will be a constant Supply of Plants, without any farther Care than clearing them from Weeds as they grow. The other Varieties are maintained in Botanick Gardens, but are seldom cultivated for Pleasure or Profit.

CORTUSA: [This Plant is so called, from *Cortusus*, a famous Botanist, who first brought it into Use.] Bear's-Ear Sanicle.

The Characters are;

It hath a perennial Root: The Leaves are roundish, rough, and crenated on the Edges, like those of Ground-Ivy: The Cup of the Flower is

small, and divided into five Parts: The Flowers are shaped like a Funnel, are cut at the Top into many Segments, and are disposed in an Umbel: The Fruit is roundish, terminating into a Point, and is closely fixed in the Cup, in which are contained many small angular Seeds.

There is but one Species of this Plant at present in *England*, which is,

CORTUSA; *Matthioli*. *Clus.* The Bear's-Ear Sanicle, or *Cortusa* of *Matthioli*.

This Plant is nearly ally'd to the *Auricula Ursi*; but the Flowers are not quite so large and fair: yet, for its Curiosity, may deserve a Place in every good Garden, especially as it requires no great Management to preserve it; for it being a Native of the *Alps*, will grow in the coldest Part of the Garden, under North-Walls, &c. but must not be planted under the dropping of Trees, nor in a too wet or stiff Soil. It is propagated by parting the Roots, in the manner of *Auricula's*; the best Season for which is about *August* or *September*. These Plants lose their Leaves in Winter, but put out new ones early in the Spring; and in *April* they produce their Flowers, which are sometimes succeeded by Seed-Pods; but it is very rare that they perfect their Seeds with us.

CORYLUS, [is so call'd, of *Karya* a Nut, q. d. a little Nut. It is also call'd *Avellana*, as tho' *Abellina*, of *Abella* a Town in *Campania*, where it grew in great Plenty.] The Hazel or Nut-tree.

The Characters are;

It hath Male Flowers (or *Katkins*) growing at remote Distances from the Fruit on the same Tree: The Nuts grow (for the most part) in Clusters, and are closely joyned together at the Bottom, each being covered with an outward Husk or Cup, which opens at the Top; and when the Fruit is ripe, it falls out: The Leaves are roundish and intire.

The Species are;

1. **CORYLUS**; *sylvestris*. C. B. The wild Hazel-Nut.
2. **CORYLUS**; *sativa*, *fructu albo*, *minore*, *sive vulgaris*. C. B. The small manured Hazel-Nut.
3. **CORYLUS**; *sativa*, *fructu rotundo maximo*. C. B. The large Cob-Nut.
4. **CORYLUS**; *sativa*, *fructu oblongo rubente*. C. B. The Red Filbert.
5. **CORYLUS**; *sativa*, *fructu oblongo rubente*, *pellicula albâ tectâ*. C. B. The White Filbert.
6. **CORYLUS**; *Hispanica*, *fructu majore*, *anguloso*. *Pluk. Alm.*

The first of these Trees is common in many Woods in *England*, from whence the Fruit is gather'd in Plenty, and brought to the *London* Markets by the Country People. This Tree is seldom planted in Gardens, (except by Persons curious in Collections of Trees and Shrubs): It delights to grow on a moist strong Soil, and may be plentifully increas'd by Suckers from the old Plants, or by laying down their Branches, which in one Year's Time will take sufficient Root for transplanting; and these will be much handsomer, and better

rooted Plants than Suckers, and will greatly out-grow them, especially while young.

The second and third Sorts are planted in Hedge-rows, in moist shady Places in Gardens: but the Fruit is much better, and in greater Quantities, when they have an open, free Air, and are not suffer'd either to grow too thick, or be over-hung or crowded with other Trees.

The fourth and fifth Sorts, viz. the Red and White Filberts, are mostly esteem'd for their Fruit, being much sweeter, and their Shells much tenderer.

The sixth Sort is annually brought from Spain in great Plenty, and sold in London all the Winter-season; from which Nuts there have been many Trees rais'd in the English Gardens; but I have not yet seen whether they prove the same with the Nuts sown.

All these Sorts may be propagated by sowing their Nuts in February; which, in order to preserve them good, should be kept in Sand in a moist Cellar, where the Vermin can't come at them to destroy them: Nor should the external Air be excluded from 'em, which would occasion their growing mouldy.

The Manner of sowing the Seeds being well known to every one, I need not here mention it, especially since it is not the surest Way to obtain the Sorts desired; for they seldom prove so good as the Nuts which were sown, or at least not one in four of them will: And the Method of propagating them by Layers being not only the surest, but also most expeditious, is what I would recommend to every one, who would cultivate these Trees for the sake of their Fruits.

CORYMBIFEROUS PLANTS, are such as have a compound discous Flower; but their Seeds have no Down adhering to them. The Name is taken from the manner of bearing its Flowers in Clusters, and spreading round in the Form of an Umbrella, as Onions, &c. Of this Kind is the Corn Marygold, common Ox-Eye, the Daisy, Camomile, Mugwort, Feverfew, &c.

Mr. Ray distinguishes them into such as have a radiate Flower, as the Sun-Flower, the Marygold, &c. and such as have a naked Flower, as the Lavender, Cotton, Agrimony, and Tansey; and also those that are akin to them, as Scabious, the Teasel, Carduus, &c.

CORYMBUS, [Κόρυμβος. Gr.] in general, signifies the Top of any thing: but among Botanists it is us'd for Clusters of Berries, as those of Ivy.

Jungius uses it, to signify the Extremity of a Stalk, so subdivided and laden with Flowers or Fruits, as to compose a spherical Figure.

It is also by modern Botanists us'd to signify a compound discous Flower, which does not fly away in Down, as the Chrysanthemum. Daisy, Chrysoscome, &c. for these kind of Flowers being spread into Breadth, do, after a sort, resemble an Umbrella, or Bunch of Ivy-Berries.

COTINUS CORIARIA. Venice Sumach.

The Characters are;

It hath round Leaves, with long Foot-stalks: The Flowers are small, consisting of five Leaves, which expand in Form of a Rose; are dispos'd in capillary Branches of very slender and stiff Filaments or Hairs, which are widely diffus'd after the manner of Plumes, and spring out of the top Branches.

There is but one Species of this Plant at present known, and that is,

COTINUS; *Coriaria*. Dod. Venice Sumach, commonly call'd Coccygria.

This Shrub grows with us about seven or eight Feet high: The Branches grow very irregular and diffus'd; but when it flowers, (which it seldom doth until it is pretty strong) it maketh a beautiful Figure, the Flowers growing, as it were, on large Plumes of Hair, which almost cover the whole Shrub: It is very proper to plant amongst other Shrubs of the same Growth, where it will make an agreeable Variety.

This Plant is propagated by laying down the tender Branches, which should have a little Slit made at one of the Joints that are laid in the Earth, as is practis'd in laying Carnations) which will greatly facilitate their Rooting. When they are sufficiently rooted, (which is commonly in one Year's Time) they may be transplanted, where they are to remain; for it seems not to bear removing well, especially when grown old; the Roots trailing far underground, which, when cut or broken, do not soon recover it; and it seldom produces many Fibres near the Stem.

The Wood of this Shrub is greatly us'd in the Southern Parts of France, where it grows in great Plenty, to dye their Woollen Cloths of a yellow Colour, or *Feuille Morte*; and the Tanners use the Leaves to prepare their Skins.

COTONEA MALUS; vide Cydonia.

COTONEASTER; vide Mespilus.

COTULA FOETIDA; vide Chamæmelum Foetidum.

COTYLEDON [Κότυλον, Gr. of Κότυλη, Gr. a Cavity; because the Leaves of this are caved, or because it resembles a Vessel wherewith the Antients us'd to draw Water, or the Hollow of the Thigh.] Navel-wort.

The Characters are;

It hath a Leaf-stalk, and the whole Appearance of Houseleek; from which it differs in having an oblong tubulous Flower consisting of one Leaf, which is divided at the Top into five Parts: The Fruit is like that of the Houseleek.

The Species are;

1. **COTYLEDON**; major. C. B. The greater Navel-wort.

2. **COTYLEDON**; *Africana, frutescens, foliis orbiculatis, limbo purpureo cinctis.* Tourn. Shrubby African Navel-wort, with round Leaves edg'd with a purple Rim.

3. **COTYLEDON**; *Africana, frutescens, folio longo & angusto, flore flavescente.* Com. Rar. Shrubby

Shrubby African Navel-wort, with a long narrow Leaf, and a yellowish Flower.

4. COTYLEDON; *Africana, frutescens, flore umbellato, coccineo.* Com. Rar. Shrubby African Navel-wort, with scarlet Flowers growing in an Umbel.

5. COTYLEDON; *Afra; folio crasso, lato, laciniato, flosculo aureo.* Boerb. Ind. African Navel-wort, with a broad thick divided Leaf, and small yellow Flowers.

6. COTYLEDON; *Afra; arborescens, major, foliis glaucis, oblongioribus, flore luteo.* Boerb. Ind. Greater Tree-like African Navel-wort, with oblong Sea-green Leaves, and a yellow Flower.

7. COTYLEDON; *major, arborescens, Afra; foliis minoribus, crassissimis, viridioribus, minutissimè punctatis.* Boerb. Ind. Greater African Tree-like Navel-wort, with small thick Leaves.

8. COTYLEDON; *major, arborescens, Afra; foliis minoribus oblongis, atro-viridibus.* Boerb. Ind. Greater African Tree-like Navel-wort, with small oblong dark green Leaves.

The first Sort (which is that us'd in Medicine) grows upon old Walls and Buildings in divers Parts of England, but is not readily to be cultivated in a Garden; it requires a dry rubbishy Soil, and to have a shady Position.

The African Kinds are all of them propagated by planting Cuttings in any of the Summer Months, which should be laid in a dry Place for a Week or more after they are taken from the Plant, before they are planted; for these abound with Juice through every Part of the Plant, which will certainly rot the Cuttings, if they are not suffer'd to lie out of the Ground, that the wounded Part may heal over, and the great Redundancy of Sap evaporate. The Soil in which these Plants thrive best, is one Third fresh light Earth from a Pasture, one Third Sand, and the other third Part Lime Rubbish, and rotten Tan, in equal Quantities: These should be well mix'd, and laid in a Heap six or eight Months before it is us'd, turning it over five or six times, that the Parts may the better incorporate; and before it is us'd, it will be proper to pass it through a Screen, to separate the large Stones and Clods, &c. therefrom.

Having prepar'd the Earth, and your Cuttings being in a fit Order for Planting, you must fill as many half-penny Pots with Earth as you have Cuttings to plant; then put one Cutting in the middle of each Pot about two Inches deep or more, according to their Strength; then give them a little Water to settle the Earth close about them, and set the Pots in a warm shady Place for about a Week, to prepare the Cuttings for putting forth Roots; after which they should be plung'd into a moderate Hot-bed of Tanners Bark, which will greatly facilitate their rooting; but observe to give them Air, by raising the Glasses at all times when the Weather will permit, as also to shade the Glasses in the Heat of the Day.

In about a Month's Time after planting, these Cuttings will be rooted, when you must

begin to expose them to the open Air by degrees, first drawing the Pots out of the Tan, and setting them on the Top; then raise the Glasses very high in the Day-time; and in about a Week after remove the Pots into a Green-house, and there harden them for another Week; after which they may be expos'd to the open Air in a well-defended Place, observing not to set them into a Place too much expos'd to the Sun, until they have been enur'd to the open Air for some Time.

In this Place the Plants may remain until the beginning of *October*; at which Time you should remove them into the Conservatory, placing them as near the Windows as possible at first, letting them have as much free open Air as the Season will permit, by keeping the Windows open whenever the Weather is good: And now you must begin to abate your Waterings, giving it to them sparingly, especially the fifth Sort, which is so very succulent, that upon its having a little too much Water in Winter, it will certainly rot; but you should not suffer its Leaves to shrink for want of Moisture, which is another Extreme some People run into for want of a little Observation; and when they are suffer'd to shrink for want of Water, they seldom fail to rot when they have Water given them, for their Parts being constricted for want of sufficient Moisture to keep their Vessels distended, they are render'd incapable of discharging this Moisture whenever they receive it again.

These Plants are all of them pretty hardy, except the sixth Sort, which must have a Stove, and may be preserv'd without any artificial Heat in the Winter. The best Method to treat these Plants is, to place them in an open airy dry Glass-Frame among *Ficoides's* and *African Houseleeks*, where they may enjoy as much of the Sun-shine as possible, and have a free dry open Air; for if these are plac'd in a common Green-house amongst shrubby Plants, which perspire freely, it will fill the House with a damp Air which these succulent Plants are apt to imbibe, and thereby becoming too replete with Moisture, do often cast their Leaves, and many times their Branches also decay; and the whole Plant perishes.

The fifth Sort, as was before mention'd, must be preserv'd in a moderate Stove, with *Alocs*, *Cereus's*, &c. which may be kept up to the temperate Heat as mark'd on Mr. *Fowler's* *Thermometers*: This must have very little Water in Winter, and be planted in a very dry sandy Soil.

The fourth Sort produces the most beautiful Flowers of any of them, and deserves a Place in every good Collection of Plants; as doth the second, third, fifth and sixth, for the regular Beauty of their Stems, and large, fair, thick succulent Leaves; and the second, third, and sixth Sorts produce very fair, handsome Bunches of Flowers, but they seldom produce Seeds in *England*.

COWSLIP; *vide* *Primula Veris*.

CRAB-TREE; *vide* *Malus*.

CRAMBE;

CRAMBE; [*κράμβη*, Gr.] Sea-Cabbage.

The Characters are;

It hath fleshy Leaves like those of the Cabbage: The Flowers are white, consisting of four Leaves: The Pointal afterwards turns to a roundish Fruit, which terminates in a Point, having but one Cell, in which is contain'd one oblong Seed.

The Species are;

1. **CRAMBE**; *maritima*, *Brassica folio*. *Tourn.* Sea-Colewort or Cabbage.

2. **CRAMBE**; *Orientalis*, *dentis leonis folio*, *erucaginis facie*. *T. Cor.* Eastern Sea-Colewort, with a Dandelion Leaf, and the Face of Wild Rocket.

The first of these Species is found wild upon the Sea-shores in divers Parts of England, but particularly in *Suffex* in great Plenty, where the Inhabitants gather it in the Spring to eat, preferring it to any of the Cabbage kind: But this must be gather'd young, soon after the Heads are thrust out of the Ground, otherwise it will be very tough and rank.

This Plant may be propagated in a Garden, by sowing the Seeds soon after it is ripe, in a sandy or gravelly Soil, where it will thrive exceedingly, and increase greatly by its creeping Roots, which will soon overspread a large Spot of Ground, if encourag'd: This may be cut for Use in *April* and *May*, while it is young; but if the Heads are suffer'd to remain, they will produce fine regular Heads of white Flowers, which appear very handsome, and will perfect its Seeds, by which it may be propagated.

The second Sort is only preserv'd in curious Gardens of Plants for Variety, but is not of any Use or Beauty.

CRANE'S-BILL; *vide* *Geranium*.

CRASSULA; *vide* *Anacampseros*.

CRATÆGUS; [*κράταιγος*, or *κράταιγος*, Gr.] The Wild Service.

The Characters are;

The Leaves are single: The Flower consists of five Leaves, which expand in Form of a Rose: The Fruit is small; and shap'd like a Pear, in which are contain'd many hard Seeds.

The Species are;

1. **CRATÆGUS**; *folio laciniato*. *Tourn.* The Common or Wild Service.

2. **CRATÆGUS**; *folio subrotundo, serrato, subtus incano*. *Tourn.* The White Beam-tree, or *Aria* *Theophrasti*.

3. **CRATÆGUS**; *sylvestris*, *Anglica*, *foliis Viburni*. The Red Chesh-Apple, or English Wild Service.

4. **CRATÆGUS**; *Virginiana*, *foliis Arbuti*. *Tourn.* The Virginian Wild-Service, with Leaves like the Strawberry-tree.

The first of these Trees is very common in divers Parts of England, growing in Woods, &c. The Leaves of this Tree are very like those of the Hawthorn, but are larger, and have fewer Segments; the Fruit grows in Bunches, and are about the Bigness of Black Cherries, which are sometimes sold in the Markets in Autumn, and are by some People

eaten as *Medlars*, &c. but have somewhat of an austere Taste.

This Tree, where it grows wild, will arise to a great Height and Magnitude, but is with Difficulty transplanted into a Garden. The surest Way to procure kindly Trees is, to sow their Fruits soon after they are ripe, which must be manag'd in the Manner directed for the Hawthorn: The second Spring after sowing, the Seeds will come up, when you must carefully keep them clear from Weeds, and in dry Weather gently water them. In this Place the Plants may remain until the second Autumn after they come up; when you must prepare a Spot of fresh Ground, and transplant them out in Rows, at about two Feet Distance Row from Row, and six Inches asunder in the Rows, observing in transplanting them, to cut off the down-right Tap-Root, which these Trees are subject to have; and when you have planted them, close the Earth about their Roots, to prevent the Frost from turning them out of the Ground. In this Nursery they may remain three or four Years, observing to keep them clear from Weeds, as also to dig the Ground between the Rows at least once a Year, being careful not to cut or disturb their Roots; this will greatly promote their Growth: then you may transplant them where they are design'd to remain, which may be to form Clumps or Wildernesses of Trees, where, by their Variety, it will add a Pleasure to the Prospect: These will grow to a considerable Bulk, if they delight in the Soil, as may be seen by several very large Trees now growing on *Hampstead* Heath, therefore they should be intermix'd amongst such as are of a large Growth.

The second Sort is also very common in England, and will grow very regular to a considerable Bulk. This is easily propagated in a Garden, either from Layers, Suckers, or by sowing the Seeds, as directed for the first Sort. This Tree deserves a Place in large Wilderness Quarters, or in regular Clumps of Trees, where, by the Diversity of its white hoary Leaves, it affords an agreeable Variety. This also bears its Fruit in Bunches in the Manner of the former, but is not quite so large, or well-tasted.

The third Sort grows wild in some of the Northern Counties of England, but is at present very rare near London. This may be propagated in the same Manner as was directed for the two former, and may have a Place, for Variety sake, in Plantations of Trees.

The Virginian Wild Service is somewhat tender while young, during which Time it will require a little Shelter, but may afterwards be transplanted into the full Ground, where, if it is not too much expos'd, it will thrive very well, and endure our severest Colds. This may be propagated by Seeds as the former, or from Layers and Suckers, and may also be budded or inarch'd into any of the former Sorts.

CRETTES, GARDEN; *vide* *Nasturtium*.

CRETTES, WATER; *vide* *Sisymbrium*.

CRETTES,

CRESESSE INDIAN; *vide* *Acriviola*.

CRITHMUM; [of *seior*, Gr. *Secret*.] Samphire.

The Characters are;

The Leaves are thick, succulent, narrow, branchy and trifid: The Flowers grow in an Umbel, each consisting of five Leaves, which expand in Form of a Rose: The Empalement of the Flower becomes a Fruit consisting of two plain and gently streak'd Seeds.

We have but one Species of this Plant common in England, which is

CRITHMUM; *five faniculum maritimum, minus*. Smaller Samphire, or Sea-Fennel.

This Plant grows in great Plenty upon the Rocks near the Sea-shore, where it is wash'd by the Salt-water, but will not grow to any Strength in a Garden, tho' it may be preserv'd several Years, and propagated by parting its creeping Roots in the Spring. This should be planted in Pots fill'd with gravelly coarse Soil, and in Summer plentifully water'd: In this Management it will grow tolerably well, and produce Flowers, but rarely perfects its Seeds in a Garden, nor is the Herb near so good for Use as that gathered from the Rocks. This Plant is greatly esteem'd for pickling, and is sometimes us'd in Medicine.

CRISTA GALLI; *vide* *Pedicularis*.

CRISTA PAVONIS; *vide* *Poinciana*.

CROCUS; [is so call'd of the Youth *Crocus*, who (as the Poets feign) lov'd *Smilax* with so violent a Passion, that by reason of Impatience he was turn'd into a Flower of his Name.] Saffron.

The Characters are;

It hath a Flower consisting of one Leaf, which is shap'd like a Lily, fistulous underneath, the Tube widening into six Segments, and resting on the Footstalk; the Pointal rises out of the Bottom of the Flower, and is divided into three beaded and crested Capillaments; but the Empalement afterwards turns to an oblong triangular Fruit, divided into three Cells, and is full of roundish Seeds: To these Marks must be added, it hath a tuberoso Root, and long narrow grassy Leaves, with a longitudinal white Furrow thro' the Middle of each.

In giving a List of their several Names, I shall divide them into two Classes; in the first of which I shall place all the Spring Flowering *Crocus*'s nearly in the Order of their Flowering; and in the second, shall insert those which flower in Autumn, amongst which will come the true Saffron.

1. **CROCUS**; *vernus, striatus, vulgaris*. Park. Par. The ordinary strip'd *Crocus*, commonly call'd the Scots *Crocus*.

2. **CROCUS**; *vernus, luteus, versicolor, primus*. Park. Par. The best Cloth of Gold *Crocus*.

3. **CROCUS**; *vernus, latifolius, flavus*. C. B. The Dutch yellow *Crocus*.

4. **CROCUS**; *vernus, minor, albicans*. C. B. Small whitish Spring *Crocus*.

5. **CROCUS**; *vernus, flore albo, purpureo-*

violaceo basi. C. B. Spring *Crocus*, with a white Flower and a purple Violet Bottom.

6. **CROCUS**; *vernus, latifolius, flavo vario flore duplici*. Clus. Hist. The double Cloth of Gold *Crocus*.

7. **CROCUS**; *vernus, latifolius flavus, flore, minore, & pallidior*. C. B. Spring *Crocus*, with smaller pale yellow Flowers.

8. **CROCUS**; *vernus, latifolius flavo-varius*. C. B. Spring *Crocus*, with yellow variable Flowers.

9. **CROCUS**; *vernus, angustifolius, magno flore candido*. C. B. Narrow-leav'd Spring *Crocus*, with large white Flowers.

10. **CROCUS**; *vernus, albus striatus*. Park. Par. The white strip'd *Crocus*.

11. **CROCUS**; *vernus, albus, polyanthos, versicolor*. Park. Par. The Party-colour'd *Crocus*, with many Flowers.

12. **CROCUS**; *vernus, latifolius flore penitus albo, ad infima tubuli parum cærulescente*. Boerb. Ind. White Feather'd *Crocus*; vulgò.

13. **CROCUS**; *vernus, latifolius flore purpureo magno*. C. B. Broad-leav'd Spring *Crocus*, with a large Purple Flower.

14. **CROCUS**; *vernus, latifolius, purpureus variegatus*. C. B. Broad-leav'd Spring *Crocus*, with a purple strip'd Flower.

15. **CROCUS**; *vernus, latifolius, flore, cæruleo, lineis violaceis variegato*. C. B. Broad-leav'd Spring *Crocus*, with a blue Flower strip'd with Violet.

16. **CROCUS**; *vernus, latifolius, albus, vel cinericeus*. C. B. Broad-leav'd Spring *Crocus*, with a white or ash-coloured Flower.

17. **CROCUS**; *vernus, latifolius, purpureo-violaceus*. C. B. The lesser Purple Violet-colour'd *Crocus*, with broad Leaves.

18. **CROCUS**; *vernus, latifolius, parvus, flore extus pallido, cum lituris, purpureis, intus cærulescente pallido*. Boerb. Ind. Broad-leav'd Spring *Crocus*, with a small Flower of a pale Colour on the Outside with Purple Stripes, and the Inside of a pale blue Colour.

19. **CROCUS**; *vernus, angustifolius, parvo flore*. C. B. Narrow-leav'd Spring *Crocus*, with a small Purple Flower.

20. **CROCUS**; *vernus, capillari folio*. Clus. App. Spring *Crocus*, with a capillaceous Leaf.

There are several other Varieties of the Spring *Crocus* to be found in the curious Gardens of Florists, which are seminal Productions; for there may be as great Variety of these Flowers rais'd from Seeds, as there is of *Hyacinths*, *Iris*'s, &c. were we curious in sowing and sowing the Seeds of all the different Kinds. The manner of sowing these Seeds being exactly the same with the *Xyphium*, I shall refer the Reader to that Article for farther Instructions, but shall observe here; that the Seeds should be sown soon after they are ripe.

All these several Varieties of *Crocus*'s are very hardy, and do increase exceedingly by their Roots, especially if they are suffer'd to remain two or three Years unremov'd; they will grow in almost any Soil or Situation, and are very great Ornaments to a Garden early in the Spring of the Year before many other Flowers

Flowers appear. They are commonly planted near the Edges of Borders on the Sides of Walks: In doing of which you should be careful to plant such Sorts in the same Line as do flower at the same Time, and are of an equal Growth, otherwise the Lines will seem imperfect. These Roots losing their Fibres with their Leaves, may then be taken up and kept dry until the Beginning of *September*, observing to keep them from Vermin, for the Mice are very fond of them. When you plant these Roots, (after having drawn a Line upon the Border) make Holes with a Dibble about two Inches deep or more, according to the Lightness of the Soil, and two Inches Distance from each other, in which you must place the Roots with the Bud uppermost; then with a Rake fill up the Holes in such a manner as that the upper Part of the Root may be cover'd an Inch or more, being careful not to leave any of the Holes open, for this will intice the Mice to them, who when once they have found them out, will destroy all your Roots, if they are not prevented.

In *January*, if the Weather is mild, the *Crocus* will appear above Ground; and in *February* their Flowers will appear before the green Leaves are grown to any Length, so that the Flower seems at first to be naked; but soon after the Flowers decay, the green Leaves grow to be six or eight Inches long, which should not be cut off until they decay, notwithstanding they appear a little unsightly; for by cutting off the Leaves the Roots will be so weaken'd as not to arrive at half their usual Bigness, nor will their Flowers the succeeding Year be half so big: Their Seeds are commonly ripe about the latter End of *April* or the Beginning of *May*, when the green Leaves begin to decay.

The second Class, or autumnal *Crocus's*.

1. *CROCUS; sativus. C. B.* The True Saffron.

2. *CROCUS; Alpinus, autumnalis. C. B.* Autumnal *Crocus* of the Alps.

3. *CROCUS; juncifolius, autumnalis, flore magno purpurascens. Boerb. Ind.*

The Autumnal *Crocus's* are not so great Increasers as are those of the Spring, nor do they produce Seeds in our Climate, so that they are less common in the Gardens, except the true Saffron, which is propagated for Use in great Plenty in many Parts of *England*: These may be taken up every third Year, as was directed for the Spring *Crocus's*, but should not be kept out of the Ground longer than the Beginning of *August*, for they commonly produce their Flowers in *September* or the Beginning of *October*, so that if they remain too long out of the Ground, they will not produce their Flowers so strong, nor in such Plenty as when they are planted early.

The Method of cultivating Saffron being somewhat curious, I thought it not improper to insert in this Place an Abstract of it, as it was presented to the Royal Society by Doctor James Douglas.

As Saffron grows at present most plentifully in *Cambridge-shire*, and has grown formerly in several other Counties of *England*, the Method of Culture does not, I believe, vary much in any of them, and therefore I judge it sufficient to set down here the Observations which I employ'd proper Persons, in different Seasons, to make in the Years 1723, 1724, 1725, and 1728, up and down all that large Tract of Ground that lies between *Saffron-walden* and *Cambridge*, in a Circle about ten Miles diameter.

In that Country Saffron has been cultivated, and therefore it may reasonably be expected that the Inhabitants thereof are more thoroughly acquainted with it than they are any where else.

I shall begin with the Choice and Preparation of the Ground: The greatest Part of the Tract already mentioned, is an open level Country, with few Inclosures; and the Custom there is, as in most other Places, to crop two Years, and let the Land be fallow the third. Saffron is always planted upon fallow Ground, and all other Things being alike; they prefer that which has born Barley the Year before.

The Saffron Grounds are seldom above three Acres, or less than one; and in chusing, the principal Thing they have Regard to, is, that they be well expos'd, the Soil not poor, nor a very stiff Clay, but a temperate dry Mould, such as commonly lies upon Chalk, and is of a hazel Colour; tho', if every thing else answers, the Colour of the Mould is pretty much neglected.

The Ground being made Choice of, about *Lady-day* or the Beginning of *April*, it must be carefully plough'd, the Furrows being drawn much closer together, and deeper, if the Soil will allow it, than is done for any kind of Corn, and accordingly the Charge is greater.

About five Weeks after, during any time in the Month of *May*, they lay between twenty and thirty Loads of Dung upon each Acre, and having spread it with great Care, they plough it in as before: The shortest rotten Dung is the best; and the Farmers, who have the Conveniency of making it, spare no Pains to make it good, being sure of a proportionable Price for it. About *Midsummer* they plough a third time, and between every sixteen Feet and a half, or Pole in Breadth, they leave a broad Furrow or Trench, which serves both as a Boundary to the several Parcels, when there are several Proprietors to one Enclosure, and to throw the Weeds in at the proper Season.

To this Head likewise belongs the Fencing of the Grounds, because most commonly, tho' not always, that is done before they plant. The Fences consist of what they call dead Hedges or Hurdles, to keep out not only Cattle of all Sorts, but especially Hares, which would otherwise feed on the Saffron Leaves during the Winter.

About the Weather we need only observe, that the hottest Summers are certainly the best, and therewith if there be gentle Showers from time to time, they can hardly miss of a plentiful rich Crop, if the extreme Cold, Snow or Rain

Rain of the foregoing Winter have not prejudic'd the Heads.

The next general Part of the Culture of *Saffron* is, planting or setting the Roots: The only Instrument us'd for which, is a narrow Spade, commonly term'd a *Spit-shovel*.

The Time of Planting is commonly in the Month of *July*, a little sooner or later, according as the Weather answers. The Method is this: One Man with his Spit-shovel raises between three and four Inches of Earth, and throws it before him about six or more Inches; two Persons, generally Women, following with Heads, place them in the farthest Edge of the Trench he makes, at three Inches Distance from each other, or thereabouts: As soon as the Digger or Spitter has gone once the Breadth of the Ridge, he begins again at the other Side, and digging, as before, covers the Roots last set, and makes the same Room for the Setters to place a new Row at the same Distance from the first that they are from one another: Thus they go on till a whole Ridge, containing commonly one Rod, is planted; and the only Nicety in digging is, to leave some Part of the first *Stratum* of Earth untouched to lie under the Roots; and in setting, to place the Roots directly upon their Bottom.

What sort of Roots are to be preferr'd, shall be shewn under the fourth Head; but it must be observ'd in this Place, that formerly, when Roots were very dear, they did not plant them so thick as they do now; and that they have always some Regard to the Size of the Roots, placing the largest at a greater Distance than the small ones.

The Quantity of Roots planted in an Acre is generally about sixteen Quarters, or one hundred twenty-eight Bushels, which, according to the Distances left between them, as before assign'd, and supposing all to be an Inch in Diameter one with another, ought to amount to 392,040 in Number.

From the Time that the Roots are planted till about the Beginning of *September*, or sometimes later, there is no more Labour about them; but as they then begin to spire, and are ready to shew themselves above-ground, which is known by digging a few out of the Earth, the Ground must be carefully par'd with a sharp Hoe, and the Weeds, &c. rak'd into the Furrows, otherwise they would hinder the Growth of the Plants.

In some time after appear the *Saffron-flowers*; and this leads us to the third Branch of our present Method. The Flowers are gather'd as well before as after they are full blown; and the most proper Time for this is early in the Morning. The Owners of the *Saffron* get together a sufficient Number of Hands, who place themselves in different Parts of the Field, pull off the whole Flowers, and throw them Handful by Handful into a Basket, and so continue till all the Flowers are gather'd, which happens commonly about ten or eleven a-clock.

Having then carry'd home all they have got, they immediately spread them upon a large Table, and fall to picking out the *Fila-*

menta Styli or Chives, and together with them a pretty long Portion of the *Stylus* it self or String to which they are join'd; the rest of the Flower they throw away as useless: The next Morning they return into the Field again, whether it be wet or dry Weather, and so on daily, even on *Sundays*, till the whole Crop be gather'd.

The Chives being all pick'd out of the Flowers, the next Labour about them is to dry them on the Kiln. The Kiln is built upon a thick Plank (that it may be mov'd from Place to Place) supported by four short Legs: The Outside consists of eight Pieces of Wood about three Inches thick, in Form of a quadrangular Frame, about twelve Inches square at the Bottom on the Inside, and twenty-two Inches at Top; which is likewise equal to the perpendicular Height of it. On the Fore-side is left a Hole about eight Inches square, and four Inches above the Plank, through which the Fire is put in. Over all the rest Laths are laid pretty thick, close to one another, and nail'd to the Frame already mentioned, and then are plaister'd over on both Sides, as are also the Planks at Bottom very thick, to serve for a Hearth. Over the Mouth or widest Part goes a Hair-cloth, fix'd to the Sides of the Kiln, and likewise to two Rollers or moveable Pieces of Wood, which are turn'd by Wedges or Screws, in order to stretch the Cloth. Instead of the Hair-cloth, many People now use a Net-work, or Iron-wire, with which it is observ'd that the *Saffron* dries sooner, and with a less Quantity of Fuel: But the Difficulty in preserving the *Saffron* from burning, makes the Hair-cloth be preferr'd by the nicest Judges in Drying.

The Kiln is plac'd in a light Part of the House; and they begin by laying five or six Sheets of white Paper on the Hair-cloth, upon which they spread the wet *Saffron* between two and three Inches thick; this they cover with other Sheets of Paper, and over these lay a coarse Blanket five or six times doubled, or, instead thereof, a Canvas-pillow fill'd with Straw; and after the Fire has been lighted for some Time, the Whole is cover'd with a Board, having a large Weight upon it.

At first they give it a pretty strong Heat, to make the Chives sweat (as their Expression is); and in this, if they do not use a great deal of Care, they are in Danger of scorching, and so of spoiling all that is on the Kiln.

When it has been thus dried about an Hour, they take off the Board, Blanket, and upper Papers, and take the *Saffron* off from that which lies next it, raising at the same time the Edges of the Cake, with a Knife: Then laying on the Paper again, they slide in another Board between the Hair-cloth and under-Papers, and turn both Papers and *Saffron* upside-down; afterwards covering them (as above.)

This same Heat is continu'd for an Hour longer; then they look on the Cake again, free it from the Papers, and turn it: then they cover it, and lay on the Weight, as before.

If

If nothing happens amiss during these first two Hours, they reckon the Danger to be over ; for they have nothing more to do but to keep a gentle Fire, and to turn their Cakes every half Hour, till thoroughly dry : for the doing of which as it ought, there are requir'd full twenty-four Hours.

In Drying the larger plump Chives they use nothing more, but towards the latter-end of the Crop, when these come to be smaller, they sprinkle the Cake with a little Small-beer, to make it sweat as it ought ; and they begin now to think, that using two Linnen-cloths next the Cake, instead of the two innermost Papers, may be of some Advantage in drying : But this Practice is follow'd as yet but by few.

Their Fire may be made of any Kind of Fuel : but that which smoaks the least is best, and Charcoal, for that Reason, is preferr'd to any other.

What Quantity of *Saffron* a first Crop will produce, is very uncertain : sometimes five or six Pounds of wet Chives are got from one Rood ; sometimes not above one or two ; and sometimes not enough to make it worth while to gather and dry it. But this is always to be observ'd, that about five Pounds of wet *Saffron* go to make one Pound of dry, for the first three Weeks of the Crop, and six Pounds during the last Week : And now the Heads are planted very thick, two Pounds of dried *Saffron* may, at a Medium, be allow'd to an Acre for a first Crop, and twenty-four Pounds for the two remaining ; the third being considerably larger than the second.

In order to obtain these, there is only a Repetition to be made every Year of the Labour of Hoeing, Gathering, Picking, and Drying, in the same manner as before set down, without the Addition of any thing new ; except that they let Cattle into the Fields, after the Leaves are decay'd, to feed upon the Weeds ; or perhaps mow them for the same Use.

About the *Midsummer* after the third Crop is gathered, the Roots must be all taken up and transplanted : The Management requisite for which, is the fourth Thing to be treated of. To take up the *Saffron* Heads, or *break up the Ground* (as their Term is) they sometimes plow it, sometimes use a forked kind of Hoe, call'd a Pattock, and then the Ground is harrow'd once or twice over ; during all which Time of Ploughing or Digging, and Harrowing, fifteen or more People will find work enough to follow and gather the Heads as they are turn'd up.

They are next to be carried to the House in Sacks, and there to be clean'd and ras'd : This Labour consists in cleaning the Roots thoroughly from Earth, and from the Remains of old Roots, old Involucra and Excrecencies ; and thus they become fit to be planted in new Ground immediately, or to be kept for some Time without Danger of spoiling.

The Quantity of Roots taken up, in Proportion to those which were planted, is uncertain ; but at a Medium, it may be said, that allowing for all the Accidents which happen'd to them in the Ground, and in Breaking-up,

from each Acre may be had twenty four Quarters of clean Roots, all fit to be planted.

The Owners are sure to chuse for their own Use the largest, plumpest, and fattest Roots : but least of all do they approve the longest pointed ones, which they call *Spickets*, or *Spickards* ; for very small round or flat Roots are sometimes observ'd to flower.

This is the whole Culture of *Saffron* in the Country above mentioned ; and we have only now to consider the Charges and Profits which may be suppos'd, one Year with another, to attend that Branch of Agriculture : And of these I have drawn up the following Computation for one Acre of Ground, according to the Price of Labour in this Country.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Rent for three Years ———	3	00	00
Ploughing for three Years —	0	18	00
Dunging —————	3	00	00
Hedging —————	1	16	00
Spitting and setting the Heads	1	12	00
Weeding or Paring the Ground	1	04	00
Gathering and Picking the } Flowers ————— }	6	10	00
Drying the Flowers ———	1	06	00
Instruments of Labour for } three Years with the Kiln, } about ————— }	0	10	00
Ploughing the Ground once, } and Harrowing twice — }	0	12	00
Gathering the <i>Saffron</i> Heads	1	00	00
Rasing the Heads ———	1	12	00
<i>Total Charge</i> —	23	12	00

This Calculation is made upon Supposition, that an Acre of Ground yields twenty-six Pounds of neat *Saffron* in three Years, which I stated only as a mean Quantity between the greatest and the least, and therefore the Price of *Saffron* must be judg'd accordingly ; which I think cannot be done better than by fixing it at thirty Shillings per Pound, since in very plentiful Years it is sold at twenty, and is sometimes worth between three and four Pounds : At this Rate, twenty-six Pounds of *Saffron* are worth thirty nine Pounds ; and the neat Profits of an Acre of Ground producing *Saffron*, will in three Years amount to fifteen Pounds thirteen Shillings, or to about five Pounds four Shillings yearly.

This, I say, may be reckon'd the neat Profit of an Acre of *Saffron*, supposing that all the Labour were to be hir'd for ready Money : but as the Planter and Family do a considerable Part of the Work themselves, some of this Expence is sav'd ; that is, by planting *Saffron*, he may not only reasonably expect clear about five Pounds yearly per Acre, but also to maintain himself and Family for some Part of each Year : and it is upon this Supposition only, that the Result of other Computations can be said to have any tolerable Degree of Exactness, but the Calculations themselves are undoubtedly very inaccurate.

I have said nothing here concerning the Charge in Buying, or Profits in Selling the *Saffron*.

Saffron-beads, because in many large Tracts of Ground these must at length balance one another, while the Quantity of Ground planted yearly continues the same, which has been pretty much the Case for several Years past.

Dr. Patrick Blair designing to treat concerning the *Crocus* in his VIth Decade of his *Pharmaco-Botanologia*, did, in the Year 1725, send to me the following Queries:

1. After what Manner the Species are propagated?
2. Whether the Tap-Root springs first, or the Bulb?
3. At what Season the Leaves do spring forth?

To these Queries I sent him the following Answer:

1. As to the Propagation of the Species;

This is only by the Roots or Off-sets, which the old Roots produce in great Plenty; for I never saw any thing like a *Seed* or a *Seed-Vessel* produc'd, altho' I have let stand great Quantities of Flowers purposely to try.

2. As to the Query, Whether the Tap-Root spring first, and the Bulb be afterwards form'd?

As soon as the Roots begin to shoot upwards, there are commonly two or three large *Tap-roots* sent forth from the Side of the old Root, which will run down-right two Inches and a half or more into the Ground: At the Place where these *Bulbs* first come out from the old one, will be form'd a *Bulb*, sometimes (tho' not always, as you will hear presently) and this *Tap-Root* decays. The *Bulb* will increase in its Bigness, till at last it quite falls off, and is then left intire; which commonly happens in April, when the Green begins to decay: But many times these *tap* or *carrot* Roots never produce any *Bulbs*, but always retain the same Figure, and for ever after, I believe, are barren; for I planted a Parcel of these *carrot* Roots four Years ago in a little Bed, where they have ever since remain'd, but have not produc'd me one single Flower, notwithstanding they have produc'd a numerous Offspring of the same *carrot* Roots.

And the People about *Saffron-walden* are well appriz'd of this Barrenness, and therefore throw away all such Roots when they make a new Plantation; but as this Change of the Root is not peculiar to the *Saffron* only, permit me to digress a little to give you some Account of this Matter.

In the Parish of *Fulham* near *London*, the Gardeners us'd to drive a great Trade in the *Juncus* or *Narcissus juncifolius flore multiplici*, at which Place the greatest Quantity of those Roots was rais'd for Sale as perhaps was in any Part of *England*, and turn'd to as great Account for the Master as any Crop they could employ their Ground in, till within these seven or eight Years; since which time most of their Roots have turn'd *carrot*, and so prov'd barren, or have produc'd only single Flowers, so that the Gardeners being hereby disheartened, have thrown them out intirely, neglecting to cultivate them, satisfying themselves with this

Reason, that their Ground was tir'd with them.

But to return to the *Crocus*: Besides those Roots already mention'd, there will be three or four small *Bulbs* form'd upon the upper Part of the Root, and some underneath, which from the first Appearance assume the round Shape of its Parent Root, and have no Tap-Root belonging to them; those on the upper Part of the Root rarely emit so much as a Fibre, but receive their Nourishment immediately from the old Root; but those on the under Side send forth many Fibres all around, by which they draw their Nourishment from the Ground; these being parted from the old Root much sooner than the other, stand in need of fit Organs for receiving their Nourishment.

I have sometimes taken up some, through the Middle of which hath been a Root of the *Gramen Caninum* or *Couch grass*, which some People have imagin'd had Strength enough to force its Way through the *Crocus* Root; but the Truth is, the Root of the *Grass* closely adhering to the old Root of the *Crocus*, just at the Place where the young Roots were emitted, these young Roots being quick of Growth, inclos'd the Root of the *Grass*: And thus I have seen several Roots run through each other in the same manner.

But besides these Off-sets mention'd; directly upon the upper part of the Root is one large Root form'd of equal Bigness with the old one; and this is the time that the Root is *Radix Gemina*, as *Tournefort* calls it; for they are not so at any other Season, and therefore I think it a very improper Appellation: For when the new Roots are perfectly form'd, the old ones with their Coats fall off and die, and leave the new Roots all single: This has occasion'd several People to doubt of what *Tournefort* had said of the Roots, till I took up some Plants at that Season, and with them the two Roots of equal Bigness, i. e. the old one at the Bottom, and the new one at the Top.

Dr. Blair also happening in viewing a Root to be surpriz'd with a different Appearance from what he had seen before or heard of, sent me another Letter.

The manner of the Root was thus: From the upper Part of the Bulb, where it sends forth all the Leaves within a common Tunicle, at the Exit there was an Appendix about an Inch and an half long, about the Groiness of a large Turkey or Goose-quill, cylindrical and blunt, without the least radical Fibre by which it might receive the Nourishment; smooth or polish'd, and bluish in the Surface, consisting of several circular Lines, when cut transversly; white, with an hard greenish Centre like a Carrot when it hath push'd forth the flowering Stem; not unlike the *Stolones* of some running Root, such as the *Mints* below-ground, only the Extremity descended obliquely instead of ascending to send forth Leaves to produce a new Plant: And what is most remarkable, this did not happen to one or two Plants, but to the whole Bundle, which were above twenty distinct Sets, differing in nothing but *majus* and

minus; the *Bulb* seem'd at the same time to be pin'd and emaciated, tho' it emitted large radical Fibres like those of a *Leek*.

I having receiv'd this Account from him by Letter, sent him the following Answer.

I receiv'd yours in Answer to my last, with the Figure of the Roots of some Sets of *Crocus Autumnalis* you have taken out of the Ground: I have found a Figure in *Dodonæus* which corresponds with it, and those Roots are no new Thing with the *Saffron* Gardeners, who always throw them away when they make fresh Plantations.

Your Figure does not agree with my Tap-Roots, as you will see by the Figure taken as just from the Life as I could: In mine, you'll find the *Bulb* turn'd side-ways, which I still find to be constant in all the Roots I have examin'd, which have been a great many, and makes me suspect these Tap-Roots are occasion'd by the accidental Position of the Roots in planting, which may retard the ascending Sap, the *flowering Stem* being thereby turn'd into a crooked Figure, and the Tap-Roots are full of longitudinal Vessels of a considerable Dimension, so that the greater attracting Power of the Sap, being hereby diverted downwards, the *Flower-stem* may be quite destitute of proper Nourishment.

The Method you propose to remedy this Inconveniency will not do, for I have remov'd some of these Roots at the Season when the Tap-Roots were forming, and this alone destroyed them all; so that I am persuaded, the cutting them off entirely will kill them.

The Method I us'd with the *Junquils* was, to lay some Tiles just under the Roots to prevent their running downwards: But this has not answer'd, nor do I think it possible wholly to recover them; for the Alteration is not only in the Root and Flower, but also in the Leaf and Blade, which before was fistulous: But after this Alteration in the Root, becomes a plain sulcated Leaf, and if it ever blossoms after, the Flowers are large and single, which before were small and double: But the *Saffron*, after the Change of its Roots, produces a small narrow Blade, seldom half the Length of those in a natural State.

Upon this Dr. Blair form'd this Conclusion:

These additional Observations plainly shew, that neither the *Carrot*-Root, nor the Bastard Tap-Root, as I may call it, are merely accidental, or what may be call'd *Lusus Naturæ*, but certain Diseases incident to such Roots: for were they accidental they would not have the same Appearances to different Persons in different Soils and Climates, nor would so many taken up together have such a Resemblance to each other, as I have twice observ'd.

CROTOLARIA; [of *Κρότων*, Gr. a Rattle, because it discharges its Seeds with a rattling; or because the Infants of *Indians* make use of the Branches of this Plant furnish'd with Pods instead of Rattles.]

The Characters are;

It hath single Leaves, in which it differs from

Rest-Harrow, and the Pods are turgid, in which it differs from Spanish Broom.

The Species are;

1. **CROTOLARIA**; *Asiatica, folio singulari verrucoso, floribus cæruleis.* H. L. Asiatick *Crotolaria*, with a single warted Leaf and blue Flowers.

2. **CROTOLARIA**; *Asiatica, folio singulari cordiformi, floribus luteis.* H. L. Asiatick *Crotolaria*, with a Heart-shap'd Leaf and yellow Flower.

3. **CROTOLARIA**; *Africana, sryacis folio, flore cæruleo.* Tourn. African *Crotolaria*, with a Leaf of the Storax-Tree and a blue Flower.

4. **CROTOLARIA**; *sagittalis glabra, longioribus foliis, Americana.* Pluk. Phyt. American *Crotolaria*, with long, smooth Spear-wort Leaves.

The first, second and fourth Roots are annual: The Seeds of these must be sown on a Hot-bed early in the Spring; and when the Plants are come up, they must be transplanted into a fresh Hot-bed, and treated in the same manner as is directed for *Amaranths*; (to which Article I refer the Reader to avoid Repetition:) If these are brought forward early in the Year, they will produce their Flowers in *July*, and perfect their Seeds in *September*; but if they are late, and the *Autumn* should prove bad, they will not live to ripen Seeds.

The third Sort will abide three or four Years, if preserv'd in a warm Stove, and will produce Flowers and Seeds annually, by which it may be propagated. All these Varieties are very ornamental to curious Gardens of Plants.

CROWN IMPERIAL; *vide Corona Imperialis.*

CRUCIATA; [is so called of *Crux*, Lat. a Cross; because the Leaves are dispos'd in the Form of a Cross; i. e. having four Leaves opposite each to the other.] Cross-wort.

The Characters are;

It hath soft Leaves like the Ladies Bedstraw, from which it differs in the Number of Leaves which is produc'd at every Joint, which in this is only four, dispos'd in Form of a Cross.

The Species are;

1. **CRUCIATA**; *hirsuta.* C. B. Rough or hairy Cross-wort.

2. **CRUCIATA**; *glabra.* C. B. Smooth Cross-wort.

3. **CRUCIATA**; *Alpina, latifolia lævis.* Tourn. Broad smooth-leav'd Cross-wort of the Alps.

4. **CRUCIATA**; *Orientalis, latifolia erecta, glabra.* T. Cor. Upright and Oriental Cross-wort, with broad smooth Leaves.

The first of these Plants is sometimes us'd in Medicine: This is found wild in divers Parts of *England*, growing on dry sandy Banks.

The other Sorts are preserv'd in Botanick Gardens for the Sake of Variety, but there is no great Beauty in them. They may all of them be propagated easily by Persons curious that way, for they spread and increase by their creeping Roots, or their trailing Branches striking

striking Root as they lie upon the Ground. They love a light sandy Soil.

CRUPINA BELGARUM; *vide* Serratula.

CUCUBALUS; Berry-bearing Chick-weed.

The Characters are;

The Flower consists of five Leaves which are bifid, and dispos'd in a circular Order: The Pointal becomes a soft oval-shap'd Berry, which is included in the Flower-Cup, as in a Bladder, and containing many Kidney-shap'd Seeds.

There is but one Species of this Plant, which is,

CUCUBALUS; *Plinii. Lugd.* Berry-bearing Chickweed.

This Plant is of no great Use or Beauty, and is seldom preserv'd in Gardens, except for Variety-sake: It grows wild in many Parts of Germany, and hath also been found in the North Part of England. It is easily propagated by sowing the Seeds, or planting the Roots, which will in a short Time overspread a large Spot of Ground, if suffer'd to remain; and it delights in a moist shady Place.

CUCULLATE PLANTS, [are so call'd, of *Cuculla*, *Lat.* a Hood or Cowl, such as Monks wear, because their Flowers resemble it.]

CUCUMIS, [takes its Name of *Curvatura*, *Lat.* a Bending; because the Stalks of this Plant are very crooked.] The Cucumber.

The Characters are;

It hath a Flower consisting of one single Leaf, which is Bell-shap'd, and expanded towards the Top, and cut into many Segments, of which some are Male or Barren, having no Embryo, but only a large Style in the Middle, which is charg'd with the Farina; others are Female or Fruitful, being fasten'd to an Embryo, which is afterwards chang'd into a fleshy Fruit for the most Part oblong, and turbinated, which is divided into three or four Cells inclosing many oblong Seeds.

The Species are;

1. **CUCUMIS**; *sativus, vulgaris, maturo fructu subluteo.* C. B. The common Cucumber.

2. **CUCUMIS**; *sativus, vulgaris, fructu albo.* C. B. The white Cucumber.

3. **CUCUMIS**; *oblongus.* Dod. The long Turkey Cucumber.

The first of these Kinds is the most common in the English Gardens, of which there are two or three Varieties, differing in the Length or Roughness of the outer Skin of the Fruit: but these being only accidental Sportings of Nature, I shall pass 'em over without making any Distinction of them.

The second Sort, which is by far the better Fruit, (as being less Watery, and containing fewer Seeds) is the most common Kind cultivated in Holland; for I do not remember to have seen one of our green Sort in any of the Markets in Holland.

The third Sort is propagated in some curious Gardens, for the uncommon Length of its Fruit, and also its having less Water, and fewer Seeds: but it is not so fruitful as the common Kind, nor will it come up so easily.

The common Sort is cultivated in three different Seasons: The first of which is on Hot-Beds under Garden Frames, for early Fruit: The second is under Bell or Hand-Glasses, for the Middle Crop: And the third is in the common Ground, for a late Crop, or to pickle.

I shall begin with giving Directions for Raising Cucumbers early, which is what most Gentlemen Gardeners have an Emulation to exceed each other in; and some have been at the Pains and Expence to have ripe Fruit in every Month of the Year: Which is rather a Curiosity, than any real Advantage; for Cucumbers that are produc'd before April cannot be so wholesome as those that are later: for before the Sun hath Strength enough to warm the Beds through the Glasses in the Day-time, all the Force must proceed from the Fermentation of the Dung, which must consequently occasion a very considerable Steam, as also a great Quantity of Air will be thereby generated, which being pent up in the Hot-bed, soon becomes rancid, and the Steam of the Bed being by the Cold of the Night condensed into large Drops of Water, which being absorb'd or inspir'd by the Plants, must certainly make the Fruit crude and unhealthy, especially when the Nights are very long. This, together with the great Expence and Trouble of procuring them earlier, having almost got the better of Peoples Ambition, hath render'd it less practis'd than it hath been some Years since. I shall begin with giving plain Directions how to procure Plenty of good handsome Fruit in April:

Towards the latter End of January you must provide a Quantity of new Horse-Dung with the Litter mix'd together, (in Proportion to the Number of Plants you intend to raise, which, if for a private Family, two Loads will be full enough) this should be thrown into a Heap, mixing a few Sea-coal Ashes therewith; in about four or five Days after, the Dung will begin to heat, at which Time you may draw a little part of the Heap on the Outside flat, laying thereon a little good Earth about two Inches thick; this you should cover with a Bell-glass, laying a little dry Litter thereon; and in a Day or two after, when you perceive the Earth to be warm, you must put your Seeds therein, covering them about a quarter of an Inch with the same Earth, then put the Glass on again: and also at Night or in bad Weather observe to cover the Glass with dry Litter or Mats, &c. and in three or four Days Time (if the Dung be in a good Temper of Heat) the Plants will appear above Ground; which when you first observe, you must immediately with the adjoining Heap of Dung make a Bed for one single Light, being careful not to take the Dung away too close to the Bell-Glass, but observing to lay a little Dung round about it, as also to keep it cover'd, that the young Plants may not receive a Check thereby. This Hot-bed will require to be three Feet thick in Dung at least, which, in the making, should be carefully mix'd and beat pretty close with the Fork, to prevent

prevent the Heat from being too sudden and violent : Then lay some fine fresh Earth upon the Dung about three Inches thick, levelling it very even, and put on the Frame, covering it over in the Night, or in bad Weather with a Mat, &c. as before, in order to excite a Heat in the Bed ; and as soon as you perceive the Bed to be in a good kindly Temper of Heat, you should prick your young Plants thereon at about two Inches Distance each Way, observing to put them into the Earth almost up to their Seed-leaves.

If the Bed is of a good Temper for Heat, your Plants will take Root in less than twenty-four Hours; after which Time you must be careful to let in a little Air at such Times when the Weather will permit, as also to turn the Glasses upside downwards every Day to dry, for the Steam of the Bed condensing on the Glasses, will fall down upon the Plants, and be very injurious to them ; and therefore whenever the Weather is so bad as not to permit the Glasses to lie turn'd long, you should at least turn 'em once or twice a Day, and wipe off the Moisture with a woollen Cloth, but you must also be very careful how you let in too much cold Air, which is equally destructive to the tender Plants ; therefore, to avoid this, it is a very good Method to fasten before the upper Side of the Frame, where the Air is suffered to enter the Bed, a Piece of coarse Cloth, or a Mat, so that the Air which enters may pass through that, which will render it less injurious to your Plants.

You must also be very cautious in giving Water to the Plants while young ; and whenever this is done, it should be sparingly, and the Water should be plac'd either into a Heap of Dung, or in some other Place for some time before it is used, so as to be nearly of a Temperature for Warmth with the inclos'd Air of the Hot-bed ; and as the Plants advance in Height, you should have a little dry sifted Earth always ready, to earth up their Shanks, which will greatly strengthen them : You must also be very careful to keep up the Heat of the Bed ; which if you should find decline, you must lay a little fresh Litter round about the Sides of the Bed, and also keep the Glasses well cover'd in the Nights, or in bad Weather ; but if, on the other hand, your Bed should prove too hot, you should thrust a large Stake into the Side of the Dung in two or three Places almost to the Middle of the Bed, which will make large Holes, through which the greatest Part of the Steam will pass off without ascending to the Top of the Bed ; and when you find it has answered your Purpose by slackening the Heat of your Bed, you must stop them up again with Dung.

These Directions, if carefully attended to, will be sufficient for raising the Plants in the first Bed : You must therefore, when you perceive the third or rough Leave begin to appear, prepare another Heap of fresh Dung, which should be mix'd with Ashes, as was before directed : This should be in Quantity according to the Number of Holes you intend to make : The common Allowance for ridging out the

earliest Plants is, one Load to each Light or Hole, so that the Bed will be near three Feet thick in Dung ; but for such as are not ridg'd out till *March*, two Loads of Dung will be sufficient for three Holes ; for I could never observe any Advantage in making these Beds so thick with Dung as some People do: their Crops are seldom better, if so good, as those which are of a moderate Substance, nor are they forwarder, and the Fruit is rarely so fair, nor do the Vines continue so long in Health.

In making these Beds you must carefully mix the Dung, shaking it well with the Fork so as not to leave any Clods of Dung unseparated, as also to beat it down pretty close, to prevent the Steam from rising too hastily ; you must also be careful to lay it very even, and to beat or press down the Dung equally in every Part of the Bed, otherwise it will settle in Holes, which will be very hurtful : When you finish laying the Dung you must make a Hole exactly in the Middle of each Light about a Foot deep, and eight or nine Inches over ; these Holes must be fill'd with light fresh Earth, which should be screen'd to take out all large Stones, Clods, &c. laying it up in a Hill, and in the Middle of each thrust in a Stick about eighteen Inches long, which should stand as a Mark to find the exact Place where the Hole is ; then earth the Bed all over about three Inches thick, levelling it smooth, and afterwards set the Frame upon it, covering it with the Glasses.

In two or three Days time your Bed will be in fit Order to receive your Plants ; of which you may easily judge by pulling out one of the Sticks which was put in the Middle of the Holes, and feeling the lower Part of it, which will satisfy you what Condition your Bed is in : Then you must stir up the Earth in the Middle of the Hole with your Hand, breaking all Clods, and removing all large Stones, making the Earth hollow in Form of a Basin : Into each of these Holes you must plant four Plants ; in doing of which, observe to make the Holes for the Plants a little slanting towards the Middle of the Basin, especially if your Plants are long-shank'd : This is intended to place the Roots of the Plants as far as possible from the Dung, to which if they approach too near, their Roots are subject to be burn'd off : Then settle the Earth gently to each Plant, and if the Earth is dry, it will be proper to give them a little Water (which should be warm'd to the Temper of the Bed, as was before directed ;) and if the Sun should appear in the Middle of the Day, they should be shaded therefrom with Mats until the Plants have taken Root, which will be in two or three Days ; after which, you must let them enjoy as much of the Sun as possible, observing to turn the Lights in the Day-time to dry, as also to give a little Air whenever the Weather will permit.

You must also observe to keep the Glasses cover'd every Night, and in bad Weather ; but be very careful not to keep them cover'd too close, especially while the Bed has a great Steam in it, which will cause a Damp to settle upon

upon the Plants, which, for want of Air to keep the Fluid in Motion, will stagnate and rot them.

When your Plants are grown to be four or five Inches high, you must, with some slender forked Sticks, incline them toward the Earth, each one a separate Way; but this must be done gently at first, lest by forcing them too much, you should strain or break the tender Vessels of the Plants, which would be very hurtful to them: In this Manner you should from time to time observe to peg down the Runners as they are produc'd, laying each in exact Order, so as not to interfere or cross each other, nor should you ever after remove them from their Places, or handle them too roughly, whereby the Leaves may be broken or displac'd, which is also equally injurious to them; but whenever you have occasion to weed the Bed between the Plants, do it with great Care, holding the Leaves aside with one Hand while with the other you pull out the Weeds.

In about a Month after they are ridg'd out, you may expect to see the Beginnings of Fruit, which very often are preceded by Male Flowers, which many People are so ignorant as to pull off, calling them false Blossoms; but this I am fully convinc'd, by many Experiments, is wrong; for these Flowers are of absolute Service to promote the Welfare of the Fruit; which when these Male Flowers are intirely taken off, does very often fall away and come to nothing: Nor should the Vines be prun'd, as is too often the Practice of unskilful People, especially when they are too luxuriant, which often happens when the Seeds were fresh, or of the last Year's sowing, and the Plants in good Heart: If this should happen to be the Case, it would be very proper to pull up one of the Plants before it hath run so far as to intangle with the others; for it often happens, that two or three Plants are better than four or five, when they are vigorous; for when the Frame is too much crowded with Vine, the Fruit is seldom good, nor in such Plenty, as when there is a more moderate Quantity of Shoots, for the Air being hereby excluded from the Fruit, they often spot and decay, or fall off very young.

You must also be very careful to cover the Glasses every Night when your Fruit begins to appear, as also to lay a little fresh Litter or Mowings of Grass round the Sides of the Bed to add a fresh Heat thereto; for if the Heat of the Bed be spent, and the Nights prove cold, the Fruit will fall away and come to nothing; and when the Sun is extreme hot, in the middle of the Day, you must cover the Glasses with Mats to shade the Vines, for altho' they delight in Heat, yet the direct Rays of the Sun, when it has great Force, are very injurious, by either scorching those Leaves which are near the Glasses, or by causing too great a Perspiration, whereby the extreme Part of the Shoots and the large Leaves are left destitute of Nourishment, and the Fruit will be at a Stand, and often turn yellow before it arrives at half its Growth.

At this Time, when your Vines are spread,

so as to cover the Hot-bed, it will be of great Service, when you water them, to sprinkle them all over gently so as not to hurt the Leaves; but observe to do this not at a Time when the Sun is very hot, for hereby I have known a whole Bed of Cucumbers spoil'd, for the Water remaining upon the Surface of the Leaves in Drops, doth collect the Rays of the Sun as it were to a Focus, and so scorches the Leaves, that in one Day's-time they have, from a bright Green, become of the Colour of brown Paper.

These Directions, with diligent Observation, will be sufficient for the Management of this Crop of Cucumbers; and Vines thus treated will continue to supply you with Fruit till *Midsummer*, by which Time the second Crop will come to bear: The Sowing and Managing of which is what I shall next proceed to.

About the beginning of *March*, or a little later, according to the Earliness of the Season, you must put in your Seeds, either under a Bell-glass, or in the Upper-side of your early Hot-bed; and when the Plants are come up, they should be prick'd upon another moderate Hot-bed, which should be cover'd with Bell or Hand-glasses plac'd as close as possible to each other; The Plants should also be prick'd at about two Inches Distance from each other, observing to water and shade them until they have taken Root, which will be in a very short Time: You must also cover the Glasses with Mats every Night, or in very bad Weather; but in the Day-time, when the Weather is hot, you must raise the Glasses with a Stone on the opposite Side from the Wind, to give Air to the Plants, which will greatly strengthen them: You must also water them as you shall find they require it; but this must be done sparingly while the Plants are young.

The beginning of *April* the Plants will be strong enough to ridge out, you must therefore be provided with a Heap of new Dung, in Proportion to the Quantity of Holes you intend to plant, allowing one Load to six Holes: When your Dung is fit for Use, you must dig a Trench about two Feet four Inches wide, (and in Length just as you please, or the Place will allow); and if the Soil be dry, it should be ten Inches deep, but if wet, very little in the Ground, levelling the Earth in the Bottom; then put in your Dung, observing to stir and mix every Part of it, as was directed for the first Hot-beds, laying it close and even.

When this is done, you must make Holes about eight Inches over, and six Inches deep, just in the Middle of the Ridge, and three Feet and an half Distance from each; and if there be more than one Ridge, the Distance of those ought to be eight Feet and an half from each other; then fill the Holes with good light Earth, putting a Stick into the Middle of each for a Mark, and afterwards cover the Ridge over with Earth about four Inches thick, laying the Earth the same Thickness round the Sides: When the Earth is levell'd smooth, you must set the Glasses on upon the Holes, leaving them close down about twenty-four Hours, in which Time the Earth in the Holes will be

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warm'd sufficiently to receive the Plants; then with your Hand stir up the Earth in the Holes, making it hollow in Form of a Baſon; into each of which you ſhould plant four Plants, obſerving to water and ſhade them until they have taken Root: After which Time you muſt be careful to give them a little Air by raiſing the Glaſſes on the oppoſite Side to the Wind in proportion to the Heat of the Weather, as alſo to water them as you ſhall ſee they require it; but you muſt only raiſe the Glaſſes in the middle of the Day until the Plants do fill the Glaſſes; at which Time you ſhould raiſe the Glaſſes with a forked Stick on the South-ſide in Height proportionable to the Growth of the Plants, that they may not be ſcorch'd by the Sun: This alſo will harden and prepare the Plants to endure the open Air, but you ſhould not expoſe them too ſoon thereto, for it often happens that there are Morning Froſts in *May*, which are many times deſtructive to theſe Plants when expoſ'd thereto; it is therefore the ſureſt Method to preſerve them under the Glaſſes as long as they can be kept in without Prejudice to the Plants: And if the Glaſſes are raiſ'd with two Bricks on the Backſide, and the forked Stick on the other Side, they may be kept in a great while without Danger.

Towards the latter end of *May*, when the Weather appears ſettled and warm, you ſhould turn your Plants down gently out of the Glaſſes, but do not perform this in a very dry hot ſunny Day, but rather when there is a cloudy Sky, and an Appearance of Rain: You muſt in doing of this raiſe the Glaſſes either upon Bricks or forked Sticks, whereby they may ſtand ſecure at about four or five Inches high from the Ground, that the Plants may lie under them without bruſing, nor ſhould you take the Glaſſes quite away until the latter end of *June* or the beginning of *July*, for theſe will preſerve the Moiſture much longer to their Roots than if they were quite expoſ'd to the open Air: about three Weeks after you have turn'd the Plants out of the Glaſſes, they will have made a conſiderable Progreſs, eſpecially if the Weather has been favourable; at which time you ſhould dig up the Spaces of Ground between the Ridges, laying it very even; then lay out the Runners of the Vines in exact Order, and be careful in this Work not to diſturb the Vines too much, nor to bruſe or break the Leaves: This digging of the Ground will looſen it, and thereby render it eaſy for the Roots of the Plants to ſtrike into it, as alſo render the Surface of the Earth more agreeable to the Vines that run upon it: After this there will be no farther Care needful, but only to keep them clear from Weeds, and to water them as often as they ſhall require, which they will ſoon ſhew, by the hanging of their greater Leaves. The Ridges thus manag'd will continue to produce large Quantities of Fruit from *June* until the latter end of *Auguſt*, after which Time the Coldneſs of the Season renders them unwholſome, eſpecially if the *Autumn* proves wet.

From theſe Ridges People commonly pre-

ſerve their *Cucumbers* for Seed, by making Choice of two or three of the faireſt Fruit upon each Hole, never leaving above one upon a Plant, and that ſituated near the Root of it; for if you leave more, they will weaken the Plants ſo much, that your other Fruit will be ſmall and fewer in Number. Theſe ſhould remain upon the Vines until the end of *Auguſt*, that the Seeds may be perfectly ripe; and when you gather them from the Vines, it will be proper to ſet the Fruit in a Row upright againſt an Hedge or Wall, where they may remain until the outer Cover begins to decay; at which time you ſhould cut them open and ſcrape out the Seeds, together with the Pulp, into a Tub, which ſhould be afterwards cover'd with a Board, to prevent Filth from getting amongſt the Pulp. In this Tub it ſhould be ſuffer'd to remain eight or ten Days, obſerving to ſtir it well with a long Stick to the Bottom every Day, in order to rot the Pulp, that it may be eaſily ſeparated from the Seeds; then pour ſome Water into the Tub, ſtirring it well about, which will raiſe the Scum to the Top, but the Seeds will ſettle to the Bottom, ſo that by two or three times pouring in Water, and afterwards ſtraining it off from the Seeds, they will be perfectly clear'd from the Pulp; then you ſhould ſpread the Seeds upon a Mat, which ſhould be expoſ'd to the open Air three or four Days until they are perfectly dry, when they may be put up in Bags, and hung up in a dry Place where Vermin cannot come to them, where they will keep good for ſeveral Years, but are generally preferr'd when three or four Years old, as being apt to produce leſs vigorous, but more fruitful Plants.

I ſhall in the next place proceed to give Directions for managing *Cucumbers* for the laſt Crop, or what are generally call'd *Picklers*.

The Season for ſowing theſe is towards the latter end of *May*, when the Weather is ſettled: The Ground where theſe are commonly ſown, is between *Colliflowers*, in wide Rows, between which are allow'd four Feet and an half Space when the *Colliflowers* were planted. In theſe Rows you ſhould dig up ſquare Holes at about three Feet and an half Diſtance from each, breaking the Earth well with a Spade, and afterwards ſmoothing and hollowing it in the Form of a Baſon with your Hand; then put eight or nine Seeds into the middle of each Hole, covering them over with Earth about half an Inch thick; and if it ſhould be very dry Weather, it will be proper to water the Holes gently in a Day or two after the Seeds are ſown, in order to facilitate their Germination.

In five or ſix Days, if the Weather be good, your Plants will begin to thruſt their Heads above Ground; at which time you ſhould be very careful to keep off the Sparrows, who are very fond of the young tender Heads of theſe Plants, and if they are not prevented, will deſtroy your whole Crop: But as it is not above a Week that the Plants are in this Danger, ſo it will be no great Trouble to look after them during that Time; for when the Plants are come

come up, and have expanded their Seed-leaves, the Sparrows will not meddle with them.

You must also be careful to water them gently, as you shall find the Drought of the Season doth require; and when you perceive the third or rough Leaf of the Plants begin to appear, you must pull out all the weakest Plants, leaving only five of the most promising and best situated in each Hole, stirring the Earth round about them with a small Hoe to destroy the Weeds, and raise the Earth about the Shanks of the Plants, putting a little Earth between them, pressing it gently down with your Hand, that the Plants may be thereby separated from each other to a greater Distance; then give them a little Water (if the Weather be dry) to settle the Earth about them, which you must afterwards repeat as often as you shall find it necessary, still being careful to keep the Ground clear from Weeds.

When your *Colliflowers* are quite drawn off the Ground from between the *Cucumbers*, you must hoe and clean the Ground, drawing the Earth up round each Hole in Form of a Basin, the better to contain the Water when it is given them; and also lay out the Plants in exact Order as they are to run and extend, so that they may not interfere with each other: And if all the five Plants before left are in good Condition, you should pull out one of the worst of them, and throw it away; for four good Plants will be full enough to remain for good; then lay a little Earth between the Plants left, pressing it down gently with your Hand, the better to spread them each way, giving them a little Water to settle the Earth about them, repeating it as often as the Season shall require, and observing to keep the Ground clean from Weeds: The Plants thus manag'd, will begin to produce Fruit toward the latter end of *July*, when you may either gather them young for pickling, or suffer them to grow for large Fruit.

The Quantity of Holes necessary for a Family is about fifty or sixty, for if you have fewer, they will not produce enough to pay for pickling, without keeping them too long in the House, for you can't expect to gather more than two hundred at each time from fifty Holes; but this may be done twice a Week during the whole Season, which commonly lasts five Weeks; so that from fifty Holes you may reasonably expect to gather about two thousand in the Season, which, if they are taken small, will not be too many for a private Family, especially considering, that if you have fewer Holes, the Quantity each Week produc'd will scarcely be worth the Trouble of pickling.

But lest I should be censur'd by those who delight in having very early *Cucumbers*, for omitting what they call an essential Part of Gardening, I shall beg Leave here to subjoin a short Account of a Method which I have us'd with very good Success, to obtain *Cucumbers* very early; which is, After having rais'd my Plants in the Manner before directed, until they have put forth their rough Leaves, I prepar'd some loose wrought Baskets, about

eight Inches Diameter, and five Inches deep, with two small Handles to each; then I made a fresh Hot-bed of good Strength, which would hold a Frame of two Lights; on this I plac'd the Baskets, which were almost full of good light Earth, as near to each other as possible, by which means this small Bed would contain eighteen or twenty Baskets; then I fill'd up the Spaces between the Baskets with the same light Earth as was put into the Baskets, putting the Frame and Glasses over the Bed, which in two Days was in a proper Temperature of Heat to receive the Plants; then I put five into each Basket, observing to water and shade them until they had taken Root; afterwards managing them as was before directed for the first Crop of *Cucumbers*, observing when the Bed began to lose its Heat, to lay a little fresh Dung round the Sides, which added a new Heat to the Bed. In this Frame I suffer'd them to remain until the Plants were laid down and had run to the Sides of the Baskets; then I prepar'd the Ridge, which I made of a good Substance in Dung, and after it had lain two or three Days to heat, I remov'd the Plants in the Baskets, placing one into the Hole in the middle of each Light: These Plants in a short time after produc'd Fruit, which, by the good Temper of Heat in the Bed, grew so fast, that in three Weeks after removing the Baskets I cut *Cucumbers*. There are several Advantages in this Management; first, you can keep the Baskets in a small Room for a considerable Time, whereby your Frames may be employ'd in other Uses: And secondly, a less Quantity of Dung is requir'd in this way: Thirdly, when the Plants are in Baskets, if you find your Bed too hot, it is but raising up the Baskets, and they are secure from any Danger; and when the violent Heat is over, they may be settled down again: And lastly, by having your Plants so forward for Fruit when they are put into the Ridges, the Heat of the Bed continues to set and bring off the first Crop of Fruit; for want of which kindly Heat, the first Setting or Crop of Fruit which appears upon the Vines, either drops off, or is a long time growing to Maturity; therefore from these and many other Advantages attending this Method, I may with Safety pronounce it, the best yet known to procure *Cucumbers* in any of the Winter or Spring Months.

CUCUMIS AGRESTIS; vide Elaterium.

CUCURBITA, [is so call'd, as tho' *Curvata*, Lat. *Bended*; because this Plant always bends, unless it be supported.] The Gourd.

The Characters are;

It hath a Flower consisting of one Leaf, which is of the expanded Bell-shape; for the most part so deeply cut, that it seems to consist of five distinct Leaves: This, like the *Cucumber*, has Male and Female Flowers on the same Plant: The Fruit of some Species is long, of others round or Bottle-shap'd, and is commonly divided into six Cells, in which are contain'd many flat oblong Seeds, which have sometimes a Border round them.

The

The Species are;

1. CUCURBITA; *longa, folio molli, flore albo.* ♀. B. The long Gourd, with a soft Leaf, and a white Flower.
2. CUCURBITA; *falcata figurâ, folio molli, flore albo.* C. B. The Sickie-shap'd Gourd, with a soft Leaf, and a white Flower.
3. CUCURBITA; *latior, folio molli, flore albo.* ♀. B. Flat Gourd, with a soft Leaf, and a white Flower, commonly call'd Squashes.
4. CUCURBITA; *lagenaria, flore albo, folio molli.* C. B. Bottle-shap'd Gourd, with a soft Leaf, and a white Flower.

There are several other Varieties of this Plant, which are annually brought from *America*, where are numberless Varieties of these, and of *Pumkins* and *Calabashes*.

They may be all propagated by sowing their Seeds in *March* on a Hot-bed; and when the Plants come up, they should be transplanted on another moderate Bed, where they should have a great deal of Air to strengthen them; and when they have got four or five Leaves, they should be transplanted into Holes made upon an old Dung-hill, or some such Place, allowing them a great deal of room to run; for some of the Sorts will spread to a great Distance: I have measur'd a single Plant, which had run upwards of forty Feet from the Hole, and had produc'd a great Number of Side-Branches; so that if the Plant had been encourag'd, and all the Side-Branches permitted to remain, I dare say it would have fairly overspread twenty Rods of Ground. Which, to some People, may seem like a Romance: yet I can affirm it to be Fact. But what is this to the Account printed in the *Transactions of the Royal Society*, which was communicated to them by *Paul Dudley, Esq;* from *New England*, wherein Mention is made of a single Plant of this Kind, which, without any Culture, spread over a large Spot of Ground, and from which Plant were gather'd Two Hundred and Sixty Fruits, each, one with another, as big as an Half-Peck!

These Fruits are by some People gather'd while young, and boil'd; afterwards stripping off the outer Cover and buttering them, they eat them with Meat, and are by some People mightily esteem'd, especially the first Sort, which is counted by far the sweetest: Of this Kind I have seen a single Fruit upwards of six Feet long, which has ripen'd perfectly well. But this is not common with us; tho' I have heard of their being longer in other Countries: This Sort requires to be sown early in the Spring, and brought forward under Bell or Hand-Glasses, otherwise they seldom arrive to half their Maturity.

These Plants requiring so much Room to spread, and their Fruit being very little valu'd in *England*, hath occasion'd their not being cultivated amongst us; we having so many Plants, Roots, or Fruits, which are greatly preferable to those for Kitchen Uses: but in some Parts of *America*, where Provisions are not in so great Plenty, or so great Variety, these Fruits may be very acceptable.

CUCURBITIFERA ARBOR, [so call'd, because it bears a Fruit resembling a Gourd, having a hard Rind when ripe, containing a soft moist Pulp encompassing the Seed.] The *Calabash-Tree*.

The Characters are;

It hath an anomalous Flower, consisting of one Leaf, which is shap'd like a Bottle, and cut into several Segments: From the Cup of the Flower arises the Pistillum, which becomes a large fleshy Fruit, with a hard Shell, in which are contain'd many Heart-shap'd Seeds.

There is but one Species of this Tree at present in *England*, which is,

CUCURBITIFERA ARBOR; *Americana.* H. L. The *Calabash-Tree*.

This Tree grows to a considerable Height in the warmer Parts of *America*, where it produces a very large Fruit; the outer Coat of which becomes very hard, and, as it were, of a Woody Substance, and is of great Use to the Inhabitants for Bowls, Cups, and many other Purposes in Life: but whether the Inside or Pulp of the Fruit is of any Use to them, I can't say.

This Tree being a Native of the warmer Countries, must, with us, be kept in a Stove, with *Guava's*, &c. which Stove should be kept to the temperate Heat, as mark'd on Mr. *Fowler's Thermometers*, with which Heat I find they succeed better than in a greater. This Tree requires frequent Waterings, and a light sandy Soil, and in Summer must have a great Quantity of free Air; for if it be kept too close in that Season, the Leaves are apt to be infested by a great Number of Insects; which greatly deface the Tree, and retard its Growth. To remedy this, whenever you see them first begin to attack the Leaves, you must carefully wash them off with a Woollen Rag; and then expose the Plant (if in Summer-time) to the open Air, or set it in some cooler Place in Winter. This Plant may be propagated by planting Cuttings in any of the Summer Months, which should be put into Pots fill'd with good fresh Earth, and plung'd into a moderate Bed of Tanners Bark, observing to water and shade them in the Heat of the Day until they have taken Root. The Seeds of this Tree, if brought over fresh in the Fruit, will grow, if sown on a Hot-bed, and manag'd as was directed for the *Anana's*; to which I shall refer the Reader, to avoid Repetition.

CULMIFEROUS PLANTS [are so call'd of *Culmus*, Lat. *Straw* or *Haulm*] are such as have a smooth, jointed Stalk, and usually hollow, and at each Joint wrapp'd about with single, narrow, sharp-pointed Leaves; and their Seeds are contain'd in chaffy Husks, as Wheat, Barley, &c.

CUMINOIDES, [of *Κύμινον* and *Σίκε*, Gr. Form; because (by reason of its Likeness to it) many Authors have confounded it with *Cummin*.] Wild Cummin.

The

The Characters are ;

It hath Leaves consisting of many Lobes like those of Burnet : The small Flowers, which consist of many Petals, are collected into a round Head : The Petals (or Flower-Leaves) are fringed ; each of these Flowers are succeeded by a single Seed.

There is but one Species of this Plant, which is,

CUMINOIDES ; *vulgare*. Tourn. Common Wild Cummin.

This Plant is preserved in curious Botanick Gardens, for the sake of Variety : But it being of no great Beauty or Use, is very seldom cultivated in other Gardens. The Seeds of this Plant should be sown soon after ripe ; for if kept until Spring, they seldom succeed so well. It loves a light dry Soil : and if the Seeds are permitted to scatter upon the Ground, they will come up again, and require no farther Culture.

CUMINUM, [*Κύμινον*, of *κύειν*, Gr. to bring forth ; because it is said to be very efficacious against Barrenness.] Cummin.

The Characters are ;

The Root is Annual : The Leaves are like those of Fennel : The Seeds are small, long, narrow, and crooked ; two of which succeed each Flower, as in the other Umbelliferous Plants.

There is but one Species of this Plant at present known in England, which is,

CUMINUM. *Mor. Umb.* Cummin.

This Plant is propagated for Sale in the Island of Malta, where it is call'd *Cumino aigro*, i. e. *hot Cummin*. But *Anise*, which they also propagate in no less Quantity, they call *Cumino dolce*, i. e. *sweet Cummin*. So that many of the old Botanists were mistaken, when they made two Species of Cummin, viz. *acre*, and *dulce*.

The Seeds of this Plant are us'd in Medicine, which are brought from the above-mention'd Place ; for the Plant is too tender to be cultivated to any Advantage in England : I have sown the Seeds several times in the *Physick-Garden*, which have come up very well, and grown to be four or five Inches high ; but have constantly decay'd, without producing any good Seeds. If any Person is inclin'd to cultivate a little of this Plant for Curiosity, the best Method is, to sow the Seeds early upon a very moderate Hot-bed ; and when the Plants are come up pretty strong, they may be transplanted into a light Soil, at about four or five Inches Distance, where they may probably produce good Seeds.

CURRENT-TREE ; *vide* Ribes.

CUSPIDATED PLANTS, [are so call'd, of *Cuspis*, Lat. the Point of a Spear,] are such Plants, the Leaves of which are pointed like a Spear.

CUSTARD-APPLE ; *vide* Anona.

CYANUS, [*Κύανος*, Gr. so call'd on Account of its Blue or Azure Colour.] Bottle-Flower.

The Characters are ;

It hath a squamose hairy Calix : The Disk of the Flower is almost plain ; but the Outer Florets round the Border are large, tubulous, and deeply cut-in : These Outer Florets are always barren ; but the Inner Florets have a single naked Seed succeeding each.

The Species are ;

1. CYANUS ; *montanus, latifolius, vel verba-sculum cyanoides*. C. B. The greater broad-leav'd Blue-bottle, commonly call'd Globe-Flower.

2. CYANUS ; *angustiore folio & longiore*, *Belgicus*. H. R. Par. The greater narrow-leav'd Blue-bottle, or Globe-Flower.

3. CYANUS ; *floridus, odoratus, Turcicus, five Orientalis, major, flore purpureo*. Park. The purple sweet Sultan ; *vulgô*.

4. CYANUS ; *floridus, odoratus, Turcicus, five Orientalis, major, flore albo*. H. R. Par. The white sweet Sultan ; *vulgô*.

5. CYANUS ; *floridus, odoratus, Turcicus, five Orientalis, major, flore incarnato*. H. L. Sweet Sultan, with a pale Flower.

6. CYANUS ; *floridus, odoratus, Turcicus, five Orientalis, major, flore luteo*. H. L. The yellow sweet Sultan.

7. CYANUS ; *segetum, flore caeruleo*. C. B. Corn Blue-bottle.

8. CYANUS ; *segetum, flore albo*. C. B. Corn-bottle, with a white Flower.

9. CYANUS ; *segetum, flore variegato*. Corn-bottle, with a variable Flower.

The first and second Species are abiding Plants, which increase greatly by their creeping Roots. The first is very common in most of the old Country Gardens, but is seldom preserved in curious Flower-Gardens, because it is so apt to overspread whatever Plants grow near it : however, it may have a Place in large Borders under Trees, or in Wildernesses, where it will thrive very well : And altho' it is a Flower of little Beauty ; yet, for its Variety and long Continuance to flower, it deserves to be propagated in very large Gardens. The second is at present less common in England, being rarely to be found but in Botanick Gardens : These are multiply'd by taking Offsets from the old Roots (which they furnish in great Plenty) either in Spring or Autumn, and will grow in any Soil or Situation.

The third, fourth, fifth, and sixth Sorts are commonly sown on a Hot-bed, and treated as the *Balsamine*, or *Marvel of Peru* : but these will flower full as well if they are sown on a Border of good light Earth, in a warm Position, (except the sixth Sort, which should have a Hot-bed) ; and when the Plants come up, they may be prick'd out upon another Bed of good Earth six Inches apart each Way, where they may remain until they are strong enough to be transplanted where they are to flower ; which may be either in Pots or in Borders amongst other Annuals : in doing of which, you must be careful not to shake the Earth from their Roots ; and when they are planted, they should be water'd and shaded until they have taken new Root. In July these Plants will begin to flower, and continue until the Frost prevents them. But you should observe

to let the earliest Flowers remain for Seeds ; for if the *Autumn* should prove cold and wet, the late Flowers will not produce good Seeds, especially the yellow Sort, which seldom perfects Seeds unless they are brought to flower very early.

These Plants are annual, and rarely continue after perfecting their Seeds ; yet in order to have them flower early in the Season, you may sow their Seeds the latter End of *July* or the Beginning of *August*, that the Plants may have Strength before the cold Weather comes on, which being planted into warm Borders will endure the Cold very well, (provided they are not so forward as to run up to flower) and will flower early the next Summer ; by which Method you may always be sure to obtain good Seeds.

The Corn Bottles are also Annuals, which for the Diversity of their Flowers were propagated in Gardens, but of late Years they are almost excluded ; however, the variable Flowers are worthy of a Place in every good Garden. These should be sown in Autumn, and may be transplanted into large Borders, where they will endure the Cold, and flower early the succeeding Summer, and will grow in almost any Soil or Situation.

CYCLAMEN ; [κυκλάμεν, of κύκλος, Gr. a Circle, because the Root of this Plant is orbicular : It is call'd *Sowbread*, because the Root is round like a Loaf, and the Sows eat it.] Sowbread.

The Characters are ;

It hath a thick, round, fleshy Root : The Flowers arise singly upon Pedicles from the Root, which consist of one Leaf, divided into five or six Segments, which are reflex'd almost to the Bottom, where they are divided : The Pointal of the Flower becomes a round membranaceous Fruit, which contains many roundish Seeds, which being committed to the Earth, becomes a Root.

The Species are ;

1. **CYCLAMEN** ; *Hedera folio. C. B. flore purpureo.* Common autumnal Sowbread, with purple Flowers.

2. **CYCLAMEN** ; *Hedera folio, flore albo.* Autumnal Sowbread, with a white Flower.

3. **CYCLAMEN** ; *orbiculato folio, infernè purpurascens. C. B. Round-leav'd Sowbread,* with Leaves of a purplish Colour underneath.

4. **CYCLAMEN** ; *vernum, minus, orbiculato folio, infernè rubente, flore minore, ruberrimo. Mor. Hist.* Lesser Spring Sowbread, with roundish Leaves of a reddish Colour underneath, with small deep red Flowers.

5. **CYCLAMEN** ; *hyeme & vere florens, folio anguloso, amplo flore albo, basi purpureâ Persicum dictum H. R. Par.* The Persian, Winter, and Spring flowering Sowbread, with large white Flowers and a purple Bottom.

6. **CYCLAMEN** ; *hyeme & vere florens, folio anguloso, amplo flore carneo, basi purpurea. H. R. Par.* The Persian, Winter, and Spring flowering Sowbread, with a large Flesh-colour'd Flower and a purple Bottom.

7. **CYCLAMEN** ; *vernum album. C. B. White* Spring flowering Sowbread.

There are several other Varieties in the curious Gardens abroad, but these here mentioned are what we have at present in *England*.

The first and second Roots are very common in the *English* Gardens, and are very hardy. These are propagated by sowing their Seeds soon after they are ripe, in Tubs of fresh sandy Earth, in the manner directed for *Xiphium*, to which I shall refer to avoid Repetition. In four or five Years time they will begin to flower, but their Roots being then small, will produce very few Flowers ; and as their Roots yearly increase in Bulk, so will the Number of Flowers increase in proportion. I have seen a single Root of this Plant above fourteen Inches Diameter, which hath produc'd upwards of an hundred Flowers in one Season.

The best Season for transplanting these Roots is in *June* or *July*, soon after the Seeds are perfected ; but they should not be kept long out of the Ground, for the Roots are dispos'd to shoot out fresh Fibres with the first moist Weather after the Seeds are fall'n, and in about six Weeks to produce their Flowers, which appear upon single Footstalks before the Leaves are produc'd : After the Flowers are blown, the green Leaves appear, which continue all the Winter ; and being of a strong Green, varied with White, it makes an handsome Appearance during that Season : The Pedicle of the Flower afterwards twists like a Screw, inclosing the Embryo of the Fruit, by which means it is cover'd by the green Leaves, whereby it is protected from the Frost, &c. and about the Beginning of *June* the Seeds will be perfected.

The third Sort was formerly more common in *England* than at present. This must be treated in the same manner with the two former, and flowers in the same Season.

The fourth and seventh Sorts are tenderer than the former, and must either be planted in Pots, and shelter'd under a Frame in Winter, or be plac'd in a warm dry Border. These produce their Flowers very early in the Spring, if the Frost doth not prevent them. The Seeds of these are ripe about the same time with the former, and must be sown and manag'd in the same manner ; but the Boxes of Seeds or young Plants of these Kinds should be shelter'd in Winter.

The fifth and sixth Sorts are still more impatient of Cold and Wet than any of the former. These must constantly be preserv'd in Pots fill'd with sandy light Earth, and hous'd in Winter, but should be plac'd near the Glasses, where they may enjoy as much free open Air as possible, when the Weather will permit ; for if they are crowded under other Plants, and are kept too close, they are very subject to mould and rot ; nor should they have much Water in Winter, which is also very injurious to them : But whenever they want Water, it should be given them sparingly. In Summer these Plants may be expos'd to the open Air ; when their green Leaves will decay ; at which time you should remove them to a Place where they

they may have the Morning Sun until eleven o'Clock; but during the Time that the Roots are destitute of Leaves they should have very little Water given them, because at that Season they are not capable of discharging the Moisture. This is also the proper Season to transplant the Roots, or to fresh earth them; and as the *Autumn* comes on, that the Heat decreases, they may be remov'd into Places more expos'd to the Sun, where they may remain until *October* before they need be hous'd.

Toward *Christmas*, if the Roots are in good Health, they will begin to flower, and continue producing fresh Flowers until *April*; from which, if you intend to have any Seeds, you must let the Pots be plac'd so as to receive a great Share of fresh Air, for if their Flowers are drawn up in the House, they seldom produce any Seeds. These Seeds are ripe about *July*, when they should be immediately sown in Pots or Cases of good light undung'd Earth, which should be shelter'd in Winter under a Frame, and expos'd in Summer in the same manner as is directed for the older Roots, observing to remove them into Pots at a wider Distance when they are two Years old, and so from time to time, as their Roots increase in Bulk, you must give them more Room; and in about four or five Years time they will begin to flower, when you should let each Root have a separate Pot, which at first may be small, but when the Roots are grown large they must be put into bigger Pots.

CYDONIA; [takes its Name of *Cydon*, an Island near *Lesbos*, or the famous Town of *Crete* of that Name.] The Quince-Tree.

The Characters are;

The Tree is of low Stature; the Branches are diffus'd and crooked: The Flower and Fruit is like that of the Pear-tree; but however cultivated, the Fruit is sour and astringent, and is cover'd with a kind of Down.

The Species are;

1. **CYDONIA**; *fructu oblongo laxiori*. Tourn. The Pear Quince; *vulgô*.

2. **CYDONIA**; *fructu breviori & rotundiore*. Tourn. The Apple Quince; *vulgô*.

3. **CYDONIA**; *latifolia, Lusitanica*. Tourn. The broad-leav'd Portugal Quince.

These three Sorts are cultivated in most Nurseries near *London*, but the Portugal kind is most valu'd for the Goodness of its Fruit.

They are all easily propagated, either by Layers, Suckers, or Cuttings, which must be planted in a moist Soil. Those rais'd from Suckers are seldom so well rooted as those which are obtain'd from Cuttings or Layers, and are subject to produce Suckers again in greater Plenty, which is not so proper for Fruit-bearing Trees. The Cuttings should be planted early in the Spring, and in dry Weather must be often water'd to encourage their Rooting: The second Year after they should be remov'd into a Nursery at three Feet Distance Row from Row, and one Foot asunder in the Rows, where they must be manag'd as was directed for *Apples*: In two or three Years time these Trees will be fit to transplant,

where they are to remain for good; which should be either by the Side of a Ditch, River, or in some other moist Place, where they will produce a greater Plenty and much larger Fruit than in a dry Soil; tho' those in the dry Soil will be better tasted, and earlier ripe. These Trees require very little pruning; the chief Thing to be observ'd, is, to keep their Stems clear from Suckers, and cut off such Branches as cross each other; so likewise all upright luxuriant Shoots from the Middle of the Tree should be taken intirely out, that the Head may not be too much crowded with Wood, which is of ill Consequence to all Sorts of Fruit Trees.

These are also in great Esteem for Stocks to graft and bud *Pears* on, which for Summer and Autumn Fruits are a great Improvement to them, especially those design'd for Walls and Espaliers: For the Trees upon these Stocks do not shoot so vigorously as those upon free Stocks, and so may be kept in less Compass, and are sooner disposed to bear Fruits: But Winter Fruits do not succeed so well upon these Stocks, their Fruit being very subject to crack, and are commonly stony. The best Stocks are those which are raised from Cuttings.

CYNOGLOSSUM; [*κύνογλωσσιν*, of *κύνη* a Dog; and *γλῶσσα*, Gr. the Tongue, so call'd because the Leaves of this Plant resemble a Dog's Tongue.] Hounds-Tongue.

The Characters are;

The Cup of the Flower consists of one Leaf, which is deeply cut into five Parts: The Flower consists of one Leaf, is Funnel-shap'd, and cut into five Segments: The Pointal, which arises from the Bottom of the Flower, changes into a Fruit compos'd of four rough, and for the most part burry Cells, each containing a flat Seed affix'd to a pyramidal and quadrilateral Placenta.

The Species are;

1. **CYNOGLOSSUM**; *majus, vulgare*. C. B. Common great Hounds-Tongue.

2. **CYNOGLOSSUM**; *majus, vulgare, flore albo*. C. B. Common Hounds-Tongue, with a white Flower.

3. **CYNOGLOSSUM**; *montanum, maximum*. Tourn. The largest Mountain Hounds-Tongue.

4. **CYNOGLOSSUM**; *sempervirens*. C. B. Ever-green Hounds-Tongue.

5. **CYNOGLOSSUM**; *creticum, argenteo angusto folio*. C. B. Candia Hounds-Tongue, with narrow Silver-colour'd Leaves.

6. **CYNOGLOSSUM**; *folio molli incano, flore caruleo, striis rubris variegato*. Mierb. Hist. Soft-leav'd hoary Hounds-Tongue, with blue Flowers strip'd with Red.

7. **CYNOGLOSSUM**; *hirsutum, vinalis, minus, flosculis minimis caruleis* Mierb. Hist. The lesser hairy Hounds-Tongue, with small blue Flowers.

There are several other Varieties of this Plant which are cultivated in curious Gardens; but as they are Plants of little Beauty, and the first Sort only is that which is commonly

monly us'd in Medicine, and this growing in great Plenty wild upon Dung-hills, and in shady Lanes in divers Parts of *England*, they are therefore seldom preserved in Gardens. They may be easily cultivated by any Person that is curious that way, by sowing the Seeds early in the Spring, or in Autumn soon after they are ripe, in almost any Soil or Situation, (except the *Candia* Sort, which must have a warm Position and a dry Soil) where they will flower and seed in plenty; and if the Seeds are permitted to scatter, will abundantly supply the Place with young Plants. As the Roots are often used, so the proper Season to take them up is soon after the Leaves decay, before they shoot again; which is what should be observ'd of all Roots either for Meat or Medicine, for then it is that they have the most Virtue.

CYPRESSUS, [takes its Name either of *κύβητος* to bring forth, as tho' opening its Branches on both Sides; or of *Cyparissus*, a certain Infant whom the Poets feign to have been transform'd into a Cypress-Tree.] The Cypress-Tree.

The Characters are;

The Leaves are squamose and flat: The Male Flowers, which are squamose, grow at remote Distances from the Fruit on the same Tree: The Fruit is of a spherical Form, and is compos'd of many Woody Tubercles, in which are contain'd hard angular Seeds.

The Species are;

1. **CYPRESSUS**; *metâ in fastigium convolutâ, quæ Fœmina Plinii. Tourn.* The Common Cypress-Tree.

2. **CYPRESSUS**; *ramos extra se spargens, quæ Mas, Plinii. Tourn.* The Male spreading Cypress; *vulgô*.

3. **CYPRESSUS**; *Virginiana, foliis Acaciæ deciduis. H. L.* The Virginian Cypress-Tree, with Leaves like the *Acacia*, which fall off in Winter.

The first of these Trees is very common in most of the old Gardens in *England*, but at present is not so much in Request as formerly; tho' it is not without its Advantages: nor should it be intirely rejected, as many Persons are of Opinion; for it serves to add to the Beauty of Wildernesses or Clumps of Ever-greens. It was formerly planted in Borders of Pleasure-Gardens, and kept shorn into a pyramidal or conick Form; and some People believing them subject to be kill'd if they cut them, ty'd them up with Cords into a pyramidal Figure; which Form they are naturally dispos'd to grow in: But this winding them about, prevented the Air from entering the inward Parts of the Branches; so that the Leaves decay'd and became unsightly, and greatly retarded their Growth. And so those which are shear'd, if the Operation is not perform'd in the Spring, or early in the Summer, are very subject to be injured by sharp Winds and cutting Frosts in Winter. Wherefore, upon the Whole, I think it much better to suffer them to grow wild as they are naturally dispos'd, planting them only amongst other Ever-green Trees, where, by the Darknes of

their Green Leaves, together with their waving Heads, they will greatly add to the Variety.

The second Sort is by far the largest-growing Tree, and is the most common Timber in the *Levant*; this, if planted upon a warm Sandy or Gravelly Soil, will prosper wonderfully: and tho' it is not quite so consile a Plant as the first Sort, yet greatly recompences for that Defect, by its vigorous Growth, and Strength in resisting all Weathers. This Tree is very proper to intermix with Ever-greens of a second Size next to Pines and Firs, to form Clumps, in which Class it will keep pace with the Trees of the same Line, and be very handsome. Besides, the Wood of this Tree is very valuable, when grown to a Size fit for Planks; which I am convinc'd it will do, in as short a Space as Oaks; therefore, why should not this be cultivated for that Purpose, since there are many Places in *England* where the Soil is of a Sandy or Gravelly Nature, and seldom produces any thing worth the Manuring? Now, in such Places these Trees would thrive wonderfully, and greatly add to the Pleasure of the Owner, while growing, and afterwards render as much Profit to his Successors, as perhaps the best Plantation of Oaks; especially should the Timber prove as good here, as in the Islands of the *Archipelago*, which I see no Reason to doubt of: for we find it was so gainful a Commodity to the Island of *Candia*, that the Plantations were called *Dos Filiæ*; the Felling of one of them, being reckon'd a Daughter's Portion.

The Timber of this Tree is said to resist the Worm, Moth, and all Putrefaction, and is said to last many hundred Years. The Doors of St. Peter's Church at *Rome* were framed of this Material, which lasted from the Great Constantine to Pope *Eugenius* IVth's Time, which was Eleven Hundred Years, and were then sound and intire, when the Pope would needs change them for Gates of Brats. The Coffins were made of this Material, in which *Thucydides* tells us the *Athenians* us'd to bury their Heroes; and the Mummy-Chests brought with those condited Bodies out of *Egypt*, are many of them of this Material.

This Tree is by many learned Authors recommended for the Improvement of the Air, and a Specifick for the Lungs, as sending forth great Quantities of Aromatick and Balsamick Emissions; wherefore many of the ancient Physicians of the Eastern Countries us'd to send their Patients, who were troubled with weak Lungs, to the Island of *Candia*, which at that Time abounded with these Trees, where, from the Effects of the Air alone, very few fail'd of a perfect Cure.

The third Sort is a Native of *America*, where it grows in watry Places, and arises to a prodigious Height, and is of a wonderful Bulk: I have been inform'd, that there are Trees of this Kind in *America* which are upwards of Seventy Feet High, and several Fathoms in Circumference; which Trees grow constantly in the Water: therefore they may probably be of singular Advantage to plant in such swampy or wet Soils where few other Trees will

will grow, especially of this Kind. That they are very hardy, in respect to Cold, is evident, from some few Trees of this Kind which were formerly planted in *England*, particularly one in the Gardens of *John Tradescant* at *South-Lambeth* near *Vaux-ball*, which is upwards of Thirty Feet High, and of a considerable Bulk; which, tho' in a common Yard at present, where no Care is taken of it, but, on the contrary, many Hooks are drove into the Trunk, to fasten Cords thereto for Drying of Cloaths, yet the Tree is in great Health and Vigour; but hath not produced any Fruit as yet; which may be occasion'd for want of Moisture: for we often see many Aquatick Plants will grow upon a drier Soil; but yet are seldom so productive of either Flowers or Fruits, as those which remain growing in the Water.

These Trees are all propagated from Seeds, which should be sown early in the *Spring* on a Bed of warm, dry, sandy Earth, which must be levell'd very smooth; then sow the Seeds thereon pretty thick, sifting the same light Earth over them half an Inch thick. If the Weather should prove very warm and dry, it will be proper to water the Bed, which must be done very carefully, observing not to wash the Seeds out of the Ground. In about a Month's Time (if your Seeds are good) the young Plants will appear above-ground, which must be constantly kept clean from Weeds, and in very dry Weather should be often refresh'd with Water: but this should be done with great Caution, lest you beat these tender-rooted Plants out of the Ground.

In this Bed the young Plants may remain two Years, by which Time they will have Strength enough to be transplanted into a Nursery: The best Season for Removing them is in the Beginning of *April*, when the drying Easterly Winds of *March* are over; and, if possible, chuse a Cloudy Day, when it is inclinable to Rain: And in taking them out of the Seed-bed, preserve the Roots as intire as possible, and, if you can, a Ball of Earth to each Plant. The Soil in which these Trees should be planted, (as I before said) should be, for the two first Sorts, a warm Sand or Gravel; which when you have prepar'd, by careful digging and cleansing from all noxious Weeds, you must lay it level: Then draw the Lines where the Trees are to be planted at three Feet asunder, and plant the Trees at eighteen Inches Distance in the Rows, observing to close the Earth well to their Roots, as also to lay a little Mulch upon the Surface of the Ground about their Stems; and water them well, to settle the Earth to their Roots; which should be repeated twice a Week, until the Plants have taken fresh Root.

These Plants may remain in the Nursery three or four Years, according to the Progress they make, or your Ground is ready where they are to be planted: But if you intend to let them remain longer, you should take up every other Tree in the Rows, and transplant out; for otherwise their Roots will be matted together, so that it will render it difficult to

transplant them, as also endanger the future Growth of the Trees. When they are planted out for good, (if they are design'd for Timber) they should be planted about eighteen or twenty Feet Distance every way, and be very careful in Removing them, not to shake the Earth from their Roots; to prevent which, you should open the Ground about each Tree, cutting off all long Roots: then working under the Ball of Earth, cut the downright Roots off; and after having pared off all the Earth from the Upper-part of the Ball, as also reduc'd the Bulk of it, so that its Weight may not be too great for the Fibres to support, they may be carried upon a Hand-Barrow by two Persons to the Place where they are to be planted: but if they are to be carry'd to a very distant Place, they should either be put into Baskets, or their Roots closely matted up. When they are planted, you must settle the Earth close to their Roots, (as before) laying a little Mulch upon the Surface of the Ground about their Stems, to prevent the Sun and Wind from entring the Earth to dry their Fibres; and water them well, to settle the Ground to their Roots; which must also be repeated (if the Weather be dry) until they have taken Root: after which Time, they will require little more Care than to keep them clear from Weeds.

The first, which is the most common Sort in *England*, seldom produces good Seeds in this Country; it is therefore the best way to have the Cones brought over intire from the South Parts of *France* or *Italy*, where they ripen perfectly well, and take the Seeds out just before you sow them; for they will keep much better in the Cones, than if they are taken out: The Method to get the Seeds out, is to expose the Cones to a gentle Heat, which will cause them to open, and easily emit their Seeds.

The second Sort produces very good Seeds in *England*; so that we may hope to be supply'd with Seeds in Plenty, in a few Years, from Trees of our own Growth: And as this is the more valuable Tree, so it will be no small Advantage to our Plantations of Timber to introduce it amongst them, especially those of Ever-green Trees.

The *Virginian* Kind may also be propagated in as great Plenty; for the Cones of this may be easily procur'd from *Carolina* or *Virginia*, in both which Places they grow in great abundance; and the Seeds will rise as easily as any of the other Sorts, and are equally as hardy; These have been formerly kept in Pots and hous'd in Winter; with which Management they have not succeeded so well, as they have done in *England*, since People have planted them into the full Ground; and where they have had a moist Soil, I have observ'd them to thrive best: which is since confirm'd by Mr. *Catesby*, in his *Natural History of Carolina*, where he says, that this Tree grows in Places where the Water commonly covers the Surface of the Ground three or four Feet; so that it may be a very great Improvement to our boggy Soils. This Tree casting its Leaves

in Winter, does not so well suit with Plantations of Ever-greens at that Season; tho' in Summer, when there is the greatest Pleasure in walking among Plantations of Trees, it hath so much the Appearance of an Ever-green, as to pass for such, and therefore may be of Service to compleat Plantations, or Vista's of Cypress-Trees, where it may so happen, that a low marshy Spot of Ground may intervene.

CYSTICAPNOS; [of *κύστις* a Bladder, and *ἄρνικα*, i. e. Fumitory, q. d. the Bladder Fumitory.] African Bladder Fumitory.

The Characters are;

It hath an annual fibrose Root; the Leaves, Branches and Flowers, have the Appearance of Climbing Fumitory; the Fruit is an oval Bladder, pierc'd through by an Axis, to which are fasten'd round Seeds on every Side, inclos'd again with one common Vesicle, which is expanded about the Axis.

There is but one Species of this Plant at present known, which is

CYSTICAPNOS; *Africana, scandens. Boerb. Ind.* African Climbing Bladder Fumitory.

This Plant is annual; the Seeds of which may be sown on a warm Border, where it is to remain, for it doth not care to be remov'd: It flowers in July, and the Seeds are perfected in August or September. It is a Plant of no great Beauty, but is preserv'd in curious Botanick Gardens for the Sake of Variety.

CYTISO-GENISTA; [It is so call'd, because it resembles both the Plants *Cytisus* and *Genista*.] Common (or Green) Broom.

The Characters are;

It hath Papilionaceous (or Butterfly) Flowers; which are succeeded by compress'd Pods, in which are contain'd many Kidney-shap'd Seeds: The Branches of the Tree are flexible, and have sometimes single, and other times three Leaves join'd together.

There is but one Species of this Plant, which is,

CYTISO-GENISTA; *scoparia, vulgaris, flore luteo. Tourn.* Common Broom.

This Shrub is rarely preserv'd in Gardens, but grows wild upon barren dry Heaths in divers Parts of England, though, for Variety sake, it may have a Place amongst flowering Shrubs of a middle Growth in smaller Wilderness Quarters, where it will appear very well. This may be propagated by sowing the Seeds in the Spring, or in Autumn soon after ripe; and when the Plants are one Year old, they should be transplanted into a Nursery, in order to prevent their making downright Roots, which this Plant is very subject to; and when they have remain'd two Years in the Nursery, they will be fit to transplant into the Places where they are design'd to stand for good. The best Season for transplanting these Shrubs is in the Beginning of April, when the drying Winds are over, and, if possible, chuse a moist cloudy Day for this Work: After they are planted, the Earth should be clos'd to their Roots, and a little Mulch laid thereon; then

give them a good Watering, to settle the Earth to their Roots, and if the Season should prove dry, it should be repeated twice a Week until they have taken fresh Roots, after which they will require very little Care.

This Plant is sometimes us'd in Medicine.

CYTISUS; [This Plant takes its Name from *Cytisus*, an Island where it grew in great Plenty.] Base Tree-Trefoil.

The Characters are;

It hath Papilionaceous (or Pea-bloom) Flowers, which are succeeded by compress'd Pods, in which are contain'd several Kidney-shap'd Seeds; to which may be added, the Leaves are for the most part roundish, and somewhat like those of the Nettle-Tree.

The Species are;

1. **CYTISUS**; *Alpinus, latifolius, flore racemoso, pendulo. Tourn.* The broad-leav'd Laburnum or Bean-Trefoil.

2. **CYTISUS**; *Alpinus, angustifolius, flore racemoso, pendulo, longiori. Tourn.* The narrow-leav'd Laburnum or Bean-Trefoil, with long pendulous Flowers.

3. **CYTISUS**; *Alpinus, flore racemoso, pendulo, breviori. Tourn.* Broad-leav'd Laburnum or Bean-Trefoil, with very short pendulous Flowers.

4. **CYTISUS**; *glaber, nigricans. C. B.* The Black Base Tree-Trefoil.

5. **CYTISUS**; *Canariensis, sempervirens & incanus. Hort. Amst.* Hoary Ever-green Canary Tree-Trefoil.

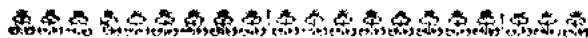
The first, second, and third Sorts grow to be large Trees, and are therefore proper for large Quarters of Flowering-trees, especially the first, which will grow to be eighteen or twenty Feet high: Their Season of Flowering is in May, at which time they afford a very agreeable Prospect, especially that Sort with long pendulous Flowers, which is by far the most beautiful Kind.

These are all propagated by sowing their Seeds (which they afford in Plenty) in March on a Bed of good fresh light Earth, sifting a little Mould over them about half an Inch thick, and in about a Month's time the Plants will come up; you must therefore keep them clear from Weeds, and if the Season should prove dry, you must often refresh them with Water, which will greatly promote their Growth: In this Bed they may remain until March following, when you may transplant them into a Nursery, in Rows three Feet Distance, and one Foot asunder in the Rows, being careful not to break the Roots, which are very tender, as also to water and mulch their Roots, to prevent the Sun and Wind from drying their Fibres: This Nursery must also be kept very clear from Weeds, and every Spring the Ground between the Rows should be dug, to loosen the Earth and destroy the Weeds. In this Nursery they may remain two or three Years, according to the Progress they make, or the Ground where they are to be planted is ready; but however if they stand longer than three Years, every other Tree should

should be remov'd, or else they should at first be planted at a much greater Distance, for otherwise their Roots will intermix, and render it difficult to remove them safely. The Season for transplanting these Trees, is either in *October* or *February*, observing to mulch and water them as before.

The fourth seldom rises with us to be above five or six Feet high, and may be kept to a regular Head: This should therefore be planted in smaller Quarters, with Shrubs of the same Growth. It flowers in *June*, at which time it makes an agreeable Figure, for the Flowers are produc'd in large Clusters very close together, so that the whole Shrub is cover'd with them. This may be propagated in the same manner as the former.

The fifth Sort is tender, and requires a Green-house in Winter, where it should be plac'd to have as much open free Air as possible when the Weather is good, but must be screen'd from Frosts and cold nipping Winds: In the Summer it may be expos'd abroad, with *Oranges*, *Myrtles*, &c. It should have a fresh light Soil, and frequent Waterings in that Season. This Plant may be either propagated by Seeds, (which should be sown on a Hot-bed in the Spring; and when the Plants come up they may be planted into small Pots, and manag'd as directed for the *African Tree-Milkwort*) or by Layers, which should be laid down in the Spring; and if kept duly water'd, will take Root against the succeeding Spring, when they may be taken off and transplanted into Pots, which should be fill'd with the same light Soil as was before directed, setting the Pots into a shady Place until the Plants have taken fresh Root; after which Time they may be expos'd with the old Plants, and manag'd as directed for them.



D A

DAFFODIL; *vide* Narcissus.

DAISIES; *vide* Bellis.

DANDELION; *vido* Dens Leonis.

DATE-TREE; *vide* Palma.

DAUCUS; [*δαῦκος*, which some derive of *δαῖν*, Gr. *to burn*, of its sharp and fiery Power, or fervent Taste.] The Carrot.

The Characters are;

It hath for the most part a fleshy Root: The Leaves are divided into narrow Segments: The Petals of the Flower are unequal, and shap'd like a Heart: The Umbel when ripe is hollow'd and contracted, appearing somewhat like a Bird's Nest: The Seeds are hairy, and in Shape of Lice.

The Species are;

1. DAUCUS; *vulgaris*. *Clus.* Common wild Carrot.

2. DAUCUS; *sylvestris*, *humilior*, *latiore folio*. Dwarf wild Carrot, with broader Leaves.

3. DAUCUS; *sativus*, *radice atrorubente*. *Tourn.* Dark Red-rooted Garden-Carrot.

4. DAUCUS; *sativus*, *radice aurantii coloris*. *Tourn.* The Orange-colour'd Carrot.

5. DAUCUS; *sativus*, *radice albâ*. *Tourn.* The White Carrot.

The first of these Species grows wild upon arable Land in most Parts of *England*, and is seldom cultivated except in Botanick Gardens. This is the particular Sort which should be us'd in Medicine, and for which the Druggists commonly sell the Seeds of the Garden Carrot.

The second Sort was found by Mr. *Rand*, near *Dover*, and is specifically different from the common Sort, as hath been prov'd by sowing them together in a Garden for several Years.

The third and fourth Sorts are commonly cultivated in Gardens for the Kitchen; as is the fifth Sort, tho' not so common in *England* as the two former: nor would they be worth the Gardeners while to propagate them; for their pale Colour would render them less acceptable in the Markets, where the deepest-colour'd Carrots are always most esteem'd, though for the Table, the White is generally prefer'd to the sweetest.

They are propagated at two or three different Seasons, or sometimes oftener, where People are fond of young Carrots through all the Summer Months. The first Season for sowing the Seeds, is soon after *Christmas*, if the Weather is open, which should be in warm Borders, under Walls, Pales, or Hedges, but they should not be sown immediately close thereto; but a Border of *Lettuce*, or other young Salad-herbs, of about six or eight Inches wide should be next the Wall, &c. for the Carrots would run up to Seed without making any tolerable Roots.

These delight in a warm sandy Soil which is light, and should be dug pretty deep, that the Roots may the better run down, for if they meet with any Obstruction, they are very apt to grow forked, and shoot out lateral Roots, especially where the Ground is too much dung'd the same Year that the Seeds are sown, which will also occasion their being Worm-eaten; it is therefore the better Method to dung the Ground intended for Carrots the Year before they are sown, that it may be consum'd and mix'd with the Earth.

These Seeds have a great Quantity of small forked Hairs upon their Borders, by which they closely adhere, so that they are difficult to sow even so as not to come up in Patches; you should therefore rub it well through both Hands, whereby the Seed will be separated before it is sown: then you should chuse a calm Day to sow it, for if the Wind blows, it will be impossible to sow it equal; for the Seeds being very light, will be blown into Heaps: When the Seed is sown, you should tread the Ground pretty close with your Feet that it may be buried, and then rake the Ground level.

When the Plants are come up, you should hoe the Ground with a small Hoe about three Inches wide, cutting down all young Weeds, and separating the Plants to four Inches Distance each Way, that they may get Strength;

Strength; and in about three Weeks after, when the Weeds begin to grow again, you should hoe the Ground over a second time, in which you should be careful not to leave two *Carrots* close to each other, as also to separate them to a greater Distance, cutting down all Weeds, and slightly stirring the Surface of the Ground in every Place, the better to prevent young Weeds from springing, as also to facilitate the Growth of the young *Carrots*.

In about three Weeks or a Month after, you must hoe them a third time, when you must clear the Weeds as before; and now you should cut out the *Carrots* to the Distance they are to remain, which must be proportion'd to the Size you intend to have them grow: If they are to be drawn while young, five or six Inches asunder will be sufficient; but if they are to grow large before they are pull'd up, they should be left eight or ten Inches distant every Way: You must also keep them clear from Weeds, which if suffer'd to grow amongst the *Carrots* will greatly prejudice them.

The second Season for sowing these Seeds is in *February*, on warm Banks situated near the Shelter of a Wall, Pale or Hedge; but those which are intended for the open large Quarters, should not be sown before the Beginning of *March*, nor should you sow any later than the End of the same Month, for those which are sown in *April* or *May* will run up to Seed before their Roots have any Bulk, especially if the Weather should prove hot and dry.

In *July* you may sow again for to stand the Winter, by which Method you will have early *Carrots* in *March*, before the Spring-sowing will be fit to draw; but these are seldom so well tasted, and are often very tough and sticky. Many People mix several other Sorts of Seeds, as *Leek*, *Onion*, *Parfnip*, *Radish*, &c. amongst their *Carrots*; and others plant *Beans*, &c. but, in my Opinion, neither of these Methods is good, for if there is a full Crop of any one of these Plants, there can be no Room for any thing else amongst them, so that what is got by the one is lost by another; and besides, it is not only more slightly, but better for the Plants of each Kind to be sown separate, and also by this Means your Ground will be clear when the Crop is gone, for to sow or plant any thing else; but when three or four Kinds are mix'd together, the Ground is seldom at Liberty before the succeeding Spring: Besides, where *Beans*, or any other tall growing Plants are mix'd or planted amongst the *Carrots*, it is apt to make them grow more in Top than Root, so that they will not be half so large as if sown singly without any other Plants amongst them.

But in order to preserve your *Carrots* for Use all the Winter and Spring, you should, about the Beginning of *November*, when the green Leaves are decay'd, dig them up, and lay them in Sand in a dry Place, where the Frost can't come to them, taking them out from time to time as you have occasion for them, reserving some of the longest and straightest

Roots for Seed, if you intend to save any; which Roots should be planted in the Middle of *February*, in a light Soil, about a Foot asunder each Way, observing to keep the Ground clear from Weeds; and about the Middle of *August*, when you find the Seeds are ripe, you must cut it off, and carry it to a dry Place, where it should be expos'd to the Sun and Air for several Days to dry; then you may beat out the Seeds, and put it up in Bags, keeping it in a dry Place until you use it. This Seed is seldom esteem'd very good after the first or second Year at most, but new Seed is always preferr'd, nor will it grow when it is more than two Years old.

DAUCUS CRETICUS; vide Myrrhis.

DAY-LILY; vide Liliastrum.

DECEMBER: Work to be done in the Kitchen-Garden and Orchard this Month.

This is commonly the darkest Month of the whole Year, and is subject to various sorts of Weather: sometimes the Ground is lock'd up by hard Frost, and cover'd over with Snow, and at other times it abounds with hard Rains, and thick, stinking Fogs, which renders it very uncomfortable stirring abroad, and is very injurious to tender Plants.

You may still, if the Weather is moderate, Land (or Earth up) those *Artichokes* which were not so done before, as also to dig and lay in Ridges such Quarters of the Kitchen-Garden as are at present clear from Crops, whereby the Ground will be mellow'd against Spring.

Make Hot-beds for *Asparagus* which is design'd for the Table about the End of *January*. The Manner of doing this, see under the Article of *Asparagus*.

Sow *Cresses*, *Lettuce*, *Mustard*, *Radish*, and other Sallad-Herbs, on a moderate Hot-bed, for a constant Supply.

Plant in this Month some *Sandwich Beans*, which are hardier than the *Windsor*, and are proper to succeed the *Spanish* or *Lisbon* Sorts, before the other will be fit for Use.

Continue also to sow *Pease*, that you may have a Succession regularly, without any Intermission, throughout the Season.

You may now also sow *Radishes* and *Lettuce* in Borders under warm Walls, Pales, or Hedges, for an early Crop.

Pick Snails out of the Holes of old Walls, or under broken Pots, or other Rubbish, where they lay themselves up during the Winter-season, and are in those Places easily taken, before they get abroad again.

Observe now carefully to pick off all dead or decay'd Leaves from your *Colliflower*-Plants, which are very injurious to them, if suffer'd to remain, (especially when the Beds are kept close cover'd); for they emit a sort of rancid Vapour, which mixing with the circumambient Air, renders it noxious to whatever Plants are surrounded therewith. But be careful to give Air to these Plants whenever the Weather will permit.

This is a proper Season for Repairing of Hedges, particularly those made of Reeds, that

that the Ground on the warm Sides thereof may be ready to sow or plant early the next Month.

Examine Orchards, and cut off all such Branches from the Trees as cause Confusion, as also all dead or rotten Branches; in doing of which, observe to make the wounded Part very smooth, and sloping, that the Wet may the easier pass off without entering the Tree.

Products of the Kitchen-Garden this Month.

Red, White, and Savoy Cabbages, some Broccoli and Brown Cole.

Asparagus upon Hot-beds, made the Beginning of November.

Several Sorts of Salad-Herbs under Glasses, or upon Hot-beds, as *Cresses, Lettuce, Radish, Mustard, &c.* as also *Mint and Tarragon*, if planted on a moderate Bed in *October*; also *Endive* and *Cellery* blanch'd.

Carrots, Parsnips, Potato's, Turnips, Skirrets, Scorzonera, and Beet Roots.

Onions Dried, Leeks, Sorrel, Chard, Beet, with Savory, Thyme, Sage, and many other Herbs for Soup.

Fruits in Prime, or yet lasting.

Apples: The Nonpareil, Golden Pippin, Aromatick Ruffet, Winter Pearmain, Golden Ruffet, Wheeler's Ruffet, Pile's Ruffet, Kentish Pippin, Holland Pippin, Haut-bonne, Renet Grise, with divers other Sorts.

Pears: The Colmar, St. Germain, S. Andrew, Virgoulé, Ambrette, Leschasserie, Epine d'Hyver, St. Augustin, Beuré d'Hyver, Louise-bonne, L'Amadotte.

For Baking or Stewing; the *Catillac, Parkinson's Warden, Union*, with some others of less Note.

As also, *Medlars, Services, some Grapes*, and other Fruits, where they have been carefully preserv'd.

Work to be done this Month in the Flower-Garden and Conservatory.

Cover your *Anemones, Ranunculus's, Carnations, Auricula's*, and other curious Flowers, in very wet, or frosty Weather, both which are equally prejudicial to them.

In frosty Weather keep the Doors and Windows of the Green-house close; but in mild Weather you must let in a little fresh Air; and in very damp or foggy Weather you should be careful to prevent the tender Shoots of your Plants from growing mouldy, by picking off the affected Part as soon as you discover it; and take all Opportunities of letting in fresh Air, which will be of great Service in clearing the Dampness of the House.

You must now water your Plants very sparingly, especially where you have no artificial Heat; in which Case, the *Torch-Thistle, Aloe*, and other succulent Plants, should not have any Water given them.

At this Season you must carefully pick off all dead or decay'd Leaves, as also you must wash off all Mildew or other Insects from the Plants in the Stove, which they are very

subject to be infested with, especially at this Time of the Year.

Take care to keep up the Fires in your Stoves, as well in dark, foggy, damp Weather, as in hard Frost, observing to regulate your Heats by a good well-graduated Thermometer.

Mix up and prepare your different Composts, both for the Flower-Garden and Green-House, and turn over those Heaps which were before mix'd, that they may sweeten, and their different Parts be the better united.

Now lay some Litter or other Mulch round the Roots of new-planted, as also the tender Exotick Trees and Shrubs, to prevent the Frost from entering the Ground, which would prejudice their tender Roots.

If the Season be mild, you may now plant *Anemone, Ranunculus, Tulip*, and other Roots which were kept out of the Ground, in order to have some late Flowers, or for a Reserve, in case the early-planted Roots should be destroy'd.

But if this Month should prove frosty, that little can be done abroad, except the Covering and Preserving Plants and Flowers, you should look over and prepare Seeds ready against the Spring, as also furnish yourself with Numbers (or Tallies) to distinguish your different Sorts of Flowers, or Seeds, which, by being prepar'd at this Season, will save the Labour, when Business of greater Importance requires your Attention abroad.

Plants in Flower in the open Air.

Single Anemones, Polyanthus Narcissus's, Stock Gilliflowers, True Black Hellebore, or Christmas Rose; Helleboraster, or Wild Hellebore with Green Flowers; Bear's-foot, Polyanthus's, Primrose, some late Auricula's, Alysson, Halimi folio, Red Flowering Spring Cyclamen, Narrow-leav'd smooth Golden-Rod, Tangier Fumitory. And in very mild Weather, Winter Aconites, and Snow-drops; as also Laurustinus's, Glastrberry Thorn, Spurge Laurel, Mezerion, Groundsel Tree, Upright Blue-berry'd Honeyfuckle, Arbutus, in Flower and Fruit; St. Peter's-wort Shrub, and the Common Furze.

Plants in Flower in the Green-house and Stove.

Leonurus, Candia Tuft Tree; Yellow Indian, Spanish White, Azorian and Ilex-leav'd Jasmynes; Aleppo Cyclamen's, Ascyron Balearicum, Alaternoides ericae folio, Geranium's, Carolina Dwarf Sun-Flower, Aster Virginianus, Hyssopi foliis, &c. Thick-leav'd Golden-Rod, Canary Campanula, Senecio folio retuso, Chrysanthemum Arborefcens, Albaza Arborefcens, Polygala Arborefcens, Double-flower'd Nasturtium, Onion-leav'd Asphodel, Capsicum's. Several Sorts of Aloes and Ficoides's, Anemonospermus, and Leucanthemum Sapore Pyrethri.

DECORTICATION, the pulling off the Outward Bark of Trees; also the Peeling or Unhusking of Roots.

DELPHINIUM, [*Δελφιν*, Gr. a Dolphin; so call'd, because the Flower, before it opens, D d d resembles

resembles a Dolphin. It is call'd *Consolida Regalis*, from its Consolidating Virtue. *Caspar Bauhin* calls it the Royal Plant, because it has its Cup turn'd backwards, like a Nobleman's Badge. *Casparinus*, *Pliny*, and the Poets, say this Plant is the true Hyacinth, because it has its Flower, i. e. the *Alpha A*, with the *Iota I*, plac'd over it; and that *Apollo* begat *Hyacinthus*, when he sent forth his last Breath: Which Point is a Particle of Bewailing. *Ovid* is said to have inscrib'd his *Lamentations* in its Leaves. It is observ'd in this Plant, that when the Leaf is folded in, it has Characters conceal'd in the White. The Germans call it *Lauskraut*, i. e. *Laufe-wort*; because, being powder'd, and strew'd on the Head, it kills Lice.] Larkspur.

The Characters are;

It hath an anomalous Flower, consisting of many dissimilar Petals (or Flower-Leaves), the uppermost of which is contracted, and ends in a Tail or Spur, and receives another bifid Petal, which, in like manner, ends in a Tail: In the Middle arises the Pointal, which becomes a Fruit consisting of many Pods or Sheaths collected into a Head, which open likewise, and are fill'd with Seeds, which are for the most part angular.

The Species are;

1. DELPHINIUM; *perenne, montanum, villosum, Aconiti folio*. Tourn. Perennial Mountain, hairy Larkspur, with a Monk's-hood Leaf.

2. DELPHINIUM; *latifolium, parvo flore*. Tourn. Broad-leav'd Larkspur, with a small Flower.

3. DELPHINIUM; *Platani folio, Staphisagria adum*. Tourn. Larkspur with a Plane-Tree Leaf, commonly called *Stavesacre*, or *Lousewort*.

4. DELPHINIUM; *segetum, flore caeruleo*. Tourn. Corn Larkspur with a blue Flower.

5. DELPHINIUM; *vulgare, flore multiplici*. Tourn. Common Larkspur with a double Flower.

6. DELPHINIUM; *bortense, flore majore, & multiplici caeruleo*. Tourn. Garden Larkspur with a large double blue Flower.

7. DELPHINIUM; *bortense, flore majore, & multiplici incarnato*. Tourn. Garden Larkspur with a large double Flesh-colour'd Flower.

8. DELPHINIUM; *bortense, flore majore, & multiplici, violaceo*. Tourn. Garden Larkspur with a large double Violet-colour'd Flower.

9. DELPHINIUM; *bortense, flore majore, & multiplici, rubro*. Tourn. Garden Larkspur with a large double red Flower.

10. DELPHINIUM; *bortense, flore majore, & multiplici, purpureo ex albo variegato*. Tourn. Garden Larkspur with a large double Flower of a purple Colour, variegated with White.

11. DELPHINIUM; *bortense, flore roseo, punctato*. Tourn. Garden Larkspur with a spotted Rose-colour'd Flower.

There are several other Varieties of this Plant, which differ either in the Colour or Size of their Flowers: but as most of them are accidental, and arise from Seeds of the same Plant, so I shall pass over them, without enumerating all their minute Differences.

The first Species here mention'd is a Native of the *Alpes*, and is remarkably different from the other Kinds of *Larkspur*, in being an abiding Plant: This is propagated by sowing the Seeds in an open light Soil in *March*; and when the Plants are come up, they may be transplanted into shady Borders at a Foot Distance from each other, where they may stand until the second Year; by which Time they will have Strength to produce Flowers, and may then be transplanted into Borders in the Pleasure-Garden, amongst other Flowering Plants, where they will make a handsome Appearance when in Flower.

The second Sort is not near so beautiful as the first, but is preserv'd in curious Gardens of Plants, for its Variety. The Flowers of this Kind are very small; and it is commonly so late in the Season before they are produc'd, that they seldom perfect their Seeds with us, unless the Plants come up in *Autumn*, and abide the *Winter*. The Seeds of this Plant I receiv'd from my Honoured Friend Mr. *Henry Hopkey*, who gather'd it on *Gibraltar Hills*, where it grows wild.

The third Sort is the *Stavesacre*, the Seeds of which are used in Medicine: This is a large handsome Plant, and produces fair large Flowers: The Seeds of this should be sown in a light sandy Soil, and a warm Situation, soon after it is ripe; for if it be kept until *Spring*, it very often miscarries. The second Year after sowing, it flowers, and soon after perfects its Seed, and dies. This Plant is at present very uncommon in *England*, and only to be found in some curious Gardens of Plants.

The other Sorts are commonly cultivated in Gardens, for the Beauty of their Flowers; where, when the several Varieties are intermix'd in a Bed, they make a goodly Shew: The Seeds of these should be sown in *Autumn*, soon after they are ripe; for those sown in the *Spring* do not grow near so large, nor will their Flowers be so double. When the Plants come up, they should be either transplanted out, or some of them pull'd up; so that the remaining Plants may be left eight or ten Inches Distance each Way; whereby they will have Room to grow, and spread their Branches, which they generally produce in great Plenty, and their Flowers will be produc'd in larger Bunches. They will require no farther Care, but to keep them clear from Weeds. In *June* these Plants will flower; and their Seeds will ripen about the Beginning of *August*. But in order to have your Flowers more beautiful, you should mark such only for Seeds as produc'd very double and finely-variegated Flowers, pulling up or cutting off all single or plain-colour'd Flowers.

DENS CANIS: [This Plant is so call'd, because the Root of it resembles the Tooth of a Dog.] Dog's Tooth.

The Characters are;

It hath a fleshy Root shap'd like a Dog's Tooth: The Leaves are broad, and spread upon the Ground, and, in Appearance, like those of the Round-leav'd Sowbread: The Flower is naked, and

and produc'd single upon each Stalk, each consisting of six Leaves, and shap'd like a Lily, and hang downward: The Petals of this Flower are reflex'd: The Pointal of the Flower becomes a roundish Fruit, in which is contain'd many oblong Seeds.

The Species are;

1. *DENS CANIS*; *latiore rotundioreque folio, flore candido. C. B.* The broad round-leav'd Dog's-Tooth, with a white Flower.

2. *DENS CANIS*; *latiore rotundioreque folio, flore ex purpurâ rubente, majore. C. B.* Broad round-leav'd Dog's-Tooth, with a large purplish red Flower.

3. *DENS CANIS*; *angustiore longioreque folio, C. B. flore albo.* Long narrow-leav'd Dog's-Tooth, with a white Flower.

4. *DENS CANIS*; *angustiore longioreque folio, flore suave rubente. H. R. Par.* Long narrow-leav'd Dog's-Tooth, with a fine red Flower.

There are some other Varieties of this Plant in the curious Gardens abroad, but these here mention'd are all that I have yet seen in England: The two first mention'd are the most common with us; the other two being very rare at present, and only to be found in a few curious Gardens.

These Plants are propagated by sowing their Seeds, as also by Off-sets from the old Roots: The Season for sowing these Seeds, and the Method of raising and managing the young Plants being the same as directed for the *Narcissus*, I shall refer the Reader thereto to avoid Repetition.

The Off-sets, which these Roots produce but sparingly, should be taken off at the time when the old Roots are transplanted, which should be when the green Leaves decay, which is commonly towards the latter End of May; but the Roots should not be kept long above-ground, for then they are apt to shrivel and dry up, which if this happens they seldom recover again. These Plants delight in a good fresh Soil, neither too light nor too heavy, but such as is of a middling Nature, and not over-dung'd; and they should have a South-East or South-West Aspect, for if they are planted in a cold Situation they seldom thrive well. They produce their Flowers early in March, for which they are valu'd, as also for the Beauty of their green Leaves. If Seeds of the different Sorts are sown, there may be some new Varieties obtain'd, which is well worth the Trial, where we have so few Species of an early beautiful Flower as of this.

DENS LEONIS; [i. e. *Lion's Tooth*. This Plant is so call'd, because it resembles the Jaw-bone of a Lion set with Teeth: It is also call'd *Caput Monachi*, i. e. *Monk's Head*, because after the Flowers are fallen off, what remains resembles a bald Head: It is the first Plant that by the Antients was describ'd under the Title of *Taraxacon*: It is by the French call'd *Pissentilis*, because it provokes Urine.] Dandelion.

The Characters are;

It agrees in all respects with the Hawk-weed, but only in its having a single naked Stalk with

one Flower upon the Top, whereas the Hawk-weeds have branching Stalks: To which may be added, the Flowers are for the most part stylous or pip'd.

There are several Species of this Plant, which are preserv'd in curious Botanick Gardens; but as they are Plants of no great Use, and withal are very troublesome in a good Garden, if suffer'd to feed, so they are never propagated. We have three or four Varieties which grow wild in England, but the most common broad-leav'd kind is what is used in Medicine. There are also some People very fond of it blanch'd in the Spring like *Endive*; but who ever has a Mind to have it for either Use, may be abundantly supply'd in the Fields.

DENTARIA; [is so call'd of *Dente*, from *Dens*, Lat. a *Tooth*, because the Root of this Plant resembles a Tooth. It is also call'd *Heptaphyllos*, of *ἑπτὰ* seven, and *φύλλον*, Gr. a *Leaf*, because this Plant hath seven Leaves: And also *Coralloides*, because its Root shines, being polish'd like a Coral.] Tooth-wort.

The Characters are;

It hath a fleshy Root which is scaly, and cut in as it were with Teeth: The Flower consists of four Leaves, which are plac'd in Form of a Cross: This is succeeded by a long Pod, which is divided into two Cells by an intermediate Partition, and when ripe, is twisted up like a Screw, and discharges the Seeds with Violence.

There are several Species of this Plant in the Gardens abroad, but I have not seen above one Sort in England, which is

DENTARIA; *heptaphyllos. C. B.* Seven-leav'd Tooth-wort.

This Plant may be propagated in the same manner as the *Hesperis*, or *Dames July Flower*; to which I refer the Reader for Directions.

DEW, is by some defin'd to be a Meteor bred of a thin cold Vapour; or, compos'd of the Steams and Vapours of the Earth, which being exhal'd by the Heat of the Sun, and kept suspended during his Presence, do, upon his Absence, convene into Drops, and then fall down to the Earth again.

Others define it, a thin, light, insensible Mist or Rain falling while the Sun is below the Horizon.

The Origin and Matter of *Dews*, is without doubt from Vapour and Exhalations of the Earth and Water rais'd by the Warmth of the Earth, &c.

There being many Vapours in the Air, tho' not always visible, hence it comes to pass, that even in clear Weather great *Dews* fall, especially in Countries where it seldom rains: For when it happens that the scatter'd Vapours are collected and condens'd together, and forc'd downwards, they must needs fall and bedew the Plants and Grass.

The thin Vesicles of which Vapours consist, being once detach'd from their Bodies, keep rising in the Air till they arrive at such a Stage as is of the same specifick Gravity with themselves, when their Rise is stopp'd: Now as 'tis the Warmth or Fire that dilates the Parts of Water,

Water, and forms those Vesicles that are specifically lighter than the Air, and are capable of ascending therein; so when that Heat declines or is lost, as by the Approach or Contiguity of any colder Body, the Vesicles condense and become heavier and descend.

Therefore the Sun warming the Atmosphere in the Day-time by the continual Influx of his Rays, the Vapours being once rais'd, continue their Progress, not meeting with any thing to increase their Gravity, till such time as they are got far beyond the Reach of the reflected Warmth of the Earth in the Middle Region of the Atmosphere, and there condense and form Clouds.

Tho' some say, 'tis disputable whether *Dews* ever congregate so as to form Clouds, but only as they are elevated by the Sun; so that when that Power is gone, as it is after the Setting of the Sun, they immediately descend: And this is more observable in very warm Weather and very hot Climates.

The Time for the Falling of the *Dew*, is either before Sun-rising, or after Sun-set: But that it may regularly fall at such Times, it is necessary for the Air to be calm, for windy or stormy Weather hinders it; but when 'tis calm Weather, and gentle Breezes are felt from the *West* about the Setting, and from the *East* about the Rising of the Sun, it is probable, that by moderately cooling the Air they collect the Vapours and precipitate them; and because the Morning Breezes are more general than the Evening ones, for this Reason the Evening *Dews* fall only here and there, but those in the Morning seldom fail to be universal: Or, as it may be otherwise express'd, when the Sun is got below the Horizon, the Atmosphere cools the Vapours, which have in the preceding Day been rais'd by the Warmth of the Earth, and the Rays of the Sun being lodg'd there, as soon as they are got out of the Air, they begin to condense apace, and spend their Stock of Heat and Fire on the cold moist Air that they pass through.

Hence it is that *Dews* are more copious in the Spring than other Seasons, there being a greater Stock of Vapour in Readiness, by reason there has been but a small Expence thereof during the Winter's Cold and Frost than at other Times.

It is found by Experience, that the *Dews* are more copious in hotter Countries than in cold, as *Pliny* observes of the Summer Nights in *Africa*, which he calls *roseida aestate noctes*; the Reason of which seems to be this, that in the Day-time the Heat of the Sun raises abundance of Vapours out of the Water; which Vapours are so extremely rarefy'd by the same Heat, that they are dispers'd far and wide; but the Cool of the Night brings them together, and condenses them to that Degree that they fall to the Ground, but not in such large Drops as Rain does: But in colder Countries, where there are frequent Rains, and the Vapours are less rarefy'd, most of them come down in Rain, and but a small Part turns to *Dew*. Besides, in *Africa* there is a great Difference between

the Heat of the Day and Night, particularly in Summer, for their Nights are long, and very cold; whereas in Northern Countries they are little colder than the Day, and much shorter than in Places nearer the Line.

Pliny likewise relates of *Egypt*, that it abounds in *Dews* throughout all the Heat of Summer; for the Air being there too hot to dissipate the Vapours in the Day-time, they never gather into Clouds, and for that Reason they have no Rain. But it is known, in Climates where the Days are excessive hot, the Nights are remarkably cold, so that the Vapours that are rais'd after Sun-set are readily condens'd into *Dews*; or perhaps notable Coldness may be rather the Effect than the Cause of the Quantity of *Dews*; for much Vapour being rais'd by the great Heat of the Earth, and the Stock of Fire being spent on it in the Day-time, the Influx of such a great Quantity of Moisture must greatly chill the Air.

The Difference between *Dew* and *Rain* seems to be only this, that *Dew* falls at some particular Times, as aforesaid, and in very small Drops, so as to be seen when down, but scarce perceivable while it is falling; whereas *Rain* falls at any time, and in grosser Drops.

The Reverend Mr. *Hales*, in his Treatise of *Vegetable Statics*, tells us, That in order to find out the Quantity of *Dew* that fell in the Night on the fifteenth of *August*, at 7 p. m. he took two glaz'd Earthen Pans which were three Inches deep, and twelve Inches Diameter in Surface; that he fill'd them with pretty moist Earth, taken from off the Surface of the Ground, and they increas'd in Weight by the Night's *Dew* 180 Grains; and decreas'd in Weight by the Evaporation of the Day 1 Ounce + 282 Grains.

He says likewise, he set these in other broader Pans, to prevent any Moisture from the Earth from sticking to the Bottom of them. He adds, that the moister the Earth is, the more *Dew* falls on it in a Night, and more than a double Quantity of *Dew* falls on a Surface of Water than there does on an equal Surface of moist Earth: The Evaporation of a Surface of Water in nine Hours Winter's dry Day, is $\frac{1}{17}$ of an Inch: The Evaporate of a Surface of Ice set in the Shade during a nine Hours Day, was $\frac{1}{31}$.

So here are 540 Grains more evaporated from the Earth every 24 Hours in Summer than fall in *Dew* in the Night; that is, in 21 Days near 26 Ounces from a circular Area of a Foot Diameter; and Circles being as the Squares of their Diameters, 10 Pounds + 2 Ounces will in 21 Days be evaporated from the Hemisphere of 30 Inches Diameter, which the *Sun-flower's* Root occupies; which, with the 29 Pounds drawn off by the Plant in the same Time, makes 39 Pounds, that is, 9 Pounds and $\frac{3}{4}$ out of every Cubick Foot of Earth, the Plants Roots occupying more than 4 Cubick Feet: But this is a much greater Degree of Driness than the Surface of the Earth ever suffers for 15 Inches Depth, even in the driest Seasons in this Country.

In a long dry Season therefore, especially within the *Tropicks*, we must have Recourse, for sufficient Moisture to keep Plants and Trees alive, to the moist *Strata* of Earth which lie next below that in which the Roots are.

Now moist Bodies always communicate of their Moisture to more dry adjoining Bodies; but this slow Motion of the Ascent of Moisture is much accelerated by the Sun's Heat to considerable Depths in the Earth, as is probable, he says, from the twentieth Experiment in the said Book.

Now 180 Grains of *Dew* falling in one Night on a Circle of a Foot Diameter = 113 square Inches; these 180 Grains being equally spread on this Surface, its Depth will be $\frac{1}{113}$ Part of an Inch = $\frac{1}{113} \times \frac{180}{274}$. He adds, that he found the *Dew* in a Winter Night to be the $\frac{1}{3}$ Part of an Inch; so that if we allow 151 Nights for the Extent of the Summer *Dew*, it will in that time arise to one Inch Depth: And reckoning the remaining 214 Nights for the Extent of the Winter's *Dew*, it will produce 2,39 Inches Depth; which makes the *Dew* of the whole Year amount to 3,39 Inches Depth.

And the Quantity which evaporated in a fair Summer's Day from the same Surface, being as 1 Ounce 282 Grains, gives $\frac{1}{15}$ Part of an Inch Depth for Evaporation, which is four times as much as fell at Night.

He says likewise, that he found by the same Means, the Evaporation of a Winter's Day to be nearly the same as in a Summer's Day; for the Earth being in Winter more saturate with Moisture, that Excess of Moisture answers to the excessive Heat in Summer.

Nic. Cruquius, N° 381. of the *Philosophical Transactions*, found that 28 Inches Depth evaporated in a whole Year from Water, i. e. $\frac{1}{12}$ of an Inch each Day at a mean Rate: But the Earth in a Summer's Day evaporates $\frac{1}{15}$ of an Inch; so the Evaporation of a Surface of Water is to the Evaporation of a Surface of Earth in Summer as 10:3.

The Quantity of Rain and *Dew* that falls in a Year is at a Medium 22 Inches: The Quantity of the Earth's Evaporation in a Year is at least $9 + \frac{1}{2}$ Inches; since that is the Rate at which it evaporates in a Summer's Day: From which $9 + \frac{1}{2}$ Inches is to be deducted 3, 39 Inches for circulating daily *Dew*, there remains 6,2 Inches; which 6,2 Inches deducted from the Quantity of Rain that falls in a Year, there remains at least 16 Inches Depth, to replenish the Earth with Moisture for Vegetation, and to supply the Springs and Rivers.

Mr. Hale proceeds to instance, in the Case of a Hop-Ground which he gives in his ninth Experiment of his Book of *Vegetable Staticks*, that the Evaporation there found, from the Hops, consider'd only for three Months, at $\frac{1}{10}$ Part of an Inch each Day, which will be $\frac{3}{10}$ of an Inch: But before it be allow'd 6,2 Inches to form the Surface of the Ground; which added to $\frac{3}{10}$, give 7,1 Inches; which is the utmost that can be evaporated from a Surface of Hop-Ground in a Year: So that of 22 Inches Depth of Rain, there remain 15 Inches to supply

Springs, which are more or less exhausted, according to the Driness or Wetness of the Year.

Hence we find, that 22 Inches Depth of Rain in a Year, is sufficient for all the Purposes of Nature in such flat Countries as that about *Teddington* near *Hampton-Court*: But in the Hill Countries, as in *Lancashire*, there falls 42 Inches Depth of Rain-water: From which deducting 7 Inches for Evaporation, there remain 35 Inches Depth of Water for the Springs, besides great Supplies from much more plentiful *Dews* than fall in plain Countres; which vast Stores seem so abundantly sufficient to answer the great Quantity of Water, which is convey'd away by the Springs and Rivers from those Hills, that we need not have Recourse for Supplies to the great Abyss, whose Surface at high Water is surmounted some hundreds of Feet by those vast Hills from whence the longest and greatest Rivers take their Rise.

DIAPENSIA; vide Sanicula.

DICTAMNUS ALBUS; vide Fraxinella.

DICTAMNUS; [*dictamnus*®, of *δὴ πικρὸν*, to bring forth, because this Plant is good to promote Child-birth.] Dittany.

The Characters are;

The Flower-cup consists of two Leaves; after that another athwart the former; and again, a third in like manner, until a scaly Head be thence form'd: Out of the Center of all these Scales grows a Flower, whose Crest is erect, roundish, and bifid: The Beard is divided into three Parts: These little Flowers come forth from leafy Scales after the manner of the Verticle Plants, in a long loose Spike.

The Species are;

1. DICTAMNUS; *Creticus*. C. B. Dittany of Crete.

2. DICTAMNUS; *montis Sipylis, origani foliis*. Flor. Bat. Dittany from Mount Sipylus; with wild Marjoram Leaves.

The first of these Plants hath been renown'd for many Ages, upon the Account of its sovereign Qualities in Medicine. This is generally brought over dry from the *Levant*, and is still us'd in some of the grand Preparations.

This Plant, although a Native of a warmer Country than ours, yet is tolerably hardy, and will endure the Cold of our common Winters, if planted in the open Air, provided it is planted in a dry sandy Soil: It may be propagated by planting Cuttings in any of the Summer Months; which must be shaded and water'd until they have taken Root: afterwards they may be either planted in Pots, or in a warm Border under a South Wall, where it will remain for several Years, unless destroy'd by violent hard Frosts; for which Reason 'tis advisable always to keep a Pot or two of this Plant under a Frame as a Reserve, in case those abroad should be destroy'd. This Plant produces its Flowers in June and July, but the Seeds are seldom perfected in this Climate: And altho' there is no great Beauty in the

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Flowers

Flowers of this Plant, yet for the Variety of its round hoary sweet-smelling Leaves, it deserves a Place in very good Gardens.

The second Sort was found upon Mount *Sipylus*, by Sir *George Wheeler* in his Travels, and by him sent to *Oxford*. This is a very neat Plant, affording long Spikes of Flowers which continue a long time in Beauty, and deserves a Place with the former in every good Garden. This is propagated and manag'd as the other in every respect.

DIGITALIS; [This Plant is so call'd, because the Flower of it resembles a Finger or Finger-stall.] Fox-Glove.

The Characters are;

The Leaves are produc'd alternately on the Branches: The Cup of the Flower consists of one Leaf, which is divided into six ample long Segments; The Flower consists of one Leaf, is tubulose and compress'd, and a little reflex'd at the Brim: These Flowers are dispos'd in a long Spike, and always grow upon one Side of the Stalk: The Ovary of the Flower becomes a roundish Fruit, which ends in a Point, and opens in the Middle; has two Cells, in which are contain'd many small Seeds.

The Species are;

1. **DIGITALIS**; *purpurea*. *J. B.* The purple Fox-Glove.
2. **DIGITALIS**; *vulgaris, flore carneo*. *Hort. Ed.* Common Flesh colour'd Fox-Glove.
3. **DIGITALIS**; *flore magno candido*. *J. B.* Fox-Glove, with a large white Flower.
4. **DIGITALIS**; *latifolia, flore ferrugineo*. *Mor. Hist.* Broad-leav'd Fox-Glove, with an Iron-colour'd Flower.
5. **DIGITALIS**; *angustifolia, flore ferrugineo*. *C. B.* Narrow-leav'd Fox-Glove, with an Iron-colour'd Flower.
6. **DIGITALIS**; *lutea, magno flore*. *C. B.* Fox-Glove, with a large yellow Flower.
7. **DIGITALIS**; *major, lutea, vel pallida, parvo flore*. *C. B.* Greater Fox-Glove, with a small pale-yellow Flower.
8. **DIGITALIS**; *Orientalis, folio Tragopogi, flore albido*. *T. Cor.* Eastern Fox-Glove, with a Goat's-Beard Leaf and a whitish Flower.
9. **DIGITALIS**; *Canariensis, acanthoides, frutescens, flore aureo*. *Hort. Amst.* Shrubby Canary Fox-Glove, with a Gold-colour Flower.

The first of these Plants is very common in shady Woods, and upon uncultivated Heaths in divers Parts of *England*: The two next are also Varieties of the first, from which they only differ in the Colour of the Flowers.

The fourth, fifth, and sixth Sorts are preserv'd in Gardens, for the Beauty of their Flowers; but the seventh and eighth Sorts are only cultivated in Botanick Gardens for the Sake of Variety, as being Plants of no great Beauty.

These Plants may all be propagated by sowing their Seeds in *March*, in a fresh Soil that is not too stiff; and when the Plants come up, they should be transplanted into Beds six Inches asunder, where they may remain until the

Michaelmas following, observing to keep them clear from Weeds; then you may transplant them into the middle of large Borders, intermixing the Variety of Colours at regular Distances amongst Flowers of the same Growth. In *May* following these will produce their Flowers, which will continue near a Month in Beauty, if the Season is not too hot and dry, and in *August* the Season will ripen; which if permitted to fall to the Ground, will come up in great Plenty, and abundantly stock the Garden with Plants.

Some of these Sorts seldom remain above two Years, when after having perfected their Seeds, they die, unless Care be taken to cut off the Flowers when they are in Beauty, before they begin to decay, which often causes the Roots to break out again, whereby they may be kept for several Years, (especially the Iron-colour'd Sorts) and may be increas'd by parting their Roots.

These Plants thrive best in a poor undung'd fresh Soil, nor can they be maintain'd many Years in a rich Soil, and their Flowers will be, when planted therein, much smaller, and of shorter Duration; and altho' they are some of them common in *England*, yet they make a very good Appearance in large Gardens.

The ninth Sort is of a nicer Nature, and requires to be shelter'd in a Greenhouse in Winter; which indeed it is worthy of, for it is one of the handsomest Flowers, when in Beauty, of most of the Green-house Plants: This is multiply'd by sowing the Seeds in the Spring upon a moderate Hot-bed; and when the Plants are strong enough to be remov'd, they should be planted in Pots fill'd with fresh light sandy Earth, and the Pots plung'd into a very moderate Hot-bed, in order to facilitate the Rooting of the Plants, observing to water and shade them until they have taken fresh Root; after which they must be enur'd to the open Air by degrees, and in Summer may be expos'd in a shelter'd Place amongst other Exotick Plants; In Winter the Pots should be plac'd in a Green-house, so that the Plants may enjoy as much free Air as possible, but must be preserv'd from Frost, and do require frequent Refreshings with Water.

This Plant produces its Flowers in *June*, and the Seeds ripen in *August*.

DILL; *vile Anethum*.

DIPSACUS; [*διψακος*, *Gr.* i. e. *thirsty*. It is said to have taken its Name by way of contrary, because it receives the Dew or Rain in the hollow *Sinus* of its Leaves that cohere together, by which it drives away the Injuries of Thirst. It is also call'd *Labrum Veneris*, from the Position of its Leaves, which form a Sort of Basin which contains a Liquor that beautifies the Face.] The Teasel.

The Characters are;

The whole Flower hath no proper Calix, but Leaves representing the Perianthium encompassing the Bottom of the Head: The little Flowers, which are produc'd singly from between the Scales, are collected into a Head somewhat like

like a Bee-bive; these are succeeded by longish four-corner'd Seeds.

The Species are ;

1. *DIPSACUS* ; *sylvestris*, aut *Virga Pastoris*, major. C. B. The Greater Wild Teasel.
2. *DIPSACUS* ; *sylvestris*, *capitulo minore*, vel *Nigro Pastoris*, minor. C. B. Small Wild Teasel, or Shepherd's Rod.
3. *DIPSACUS* ; *folia laciniato*. C. B. Cut-leav'd Teasel.
4. *DIPSACUS* ; *sativus*. C. B. Manured Teasel.

The first of these Plants is very common upon dry Banks in most Parts of England, and is seldom cultivated in Gardens, unless for the sake of Variety.

The second is also found wild in many Parts of England, though less common than the first.

The third is a Variety, which differs from the first, in having the Leaves deeply cut or jagged.

But it is the fourth Sort only which is cultivated for Use, which is call'd *Cardus Fullorum*, or *Fullonum*, being of singular Use in Raising the Nap upon Woollen Cloth ; for which Purpose there are great Quantities of this Plant cultivated in the West Country.

This Plant is propagated by sowing the Seed in *March*, upon a Soil that has been well dry'd : about one Peck of this Seed will sow an Acre ; for the Plants should have Room to grow, otherwise the Heads will not be so large, nor in so great Quantity. When the Plants are come up, you must hoe them in the same manner as is practis'd for *Turnips*, cutting down all the Weeds, and singling out the Plants to about six or eight Inches Distance ; and as the Plants advance, and the Weeds begin to grow again, you must hoe them a second time, cutting out the Plants to a wider Distance ; for they should be at last left at least a Foot asunder : And you should be particularly careful to clear them from Weeds, especially the first Summer ; for when the Plants have spread so as to cover the Surface of the Ground, the Weeds will not so readily grow between them. The second Year after Sowing, the Plants will shoot up to Heads, which will be fit to cut about the Beginning of *August*, at which Time they should be cut, and ty'd up in Bunches, setting them in the Sun, if the Weather be fair ; but if not, they must be set in Rooms to dry them. The common Produce is about an hundred and sixty Bundles or Staves upon an Acre, which they sell for about one Shilling a Stave. Some People sow *Caraway* and other Seeds amongst their *Teasels* : but this is not a good Method, for the one spoils the other ; nor can you so easily clear them from Weeds, as when alone.

DITTANY ; *vide* Dictamnus.

DOCK ; *vide* Lapathum.

DOG'S TOOTH ; *vide* Dens Canis.

DOG-WOOD ; *vide* Cornus.

DORIA.

The Characters are ;

It hath a perennial fibrose Root : The Leaves are almost whole, and oblong : The Cup of the Flower is cylindrical, and in Form of a Tube : The Flowers grow upon the Summits of the Branches, and are dispos'd either in Form of an Umbel, or in a loose Panicle, which are radiated like the Ragwort.

The Species are ;

1. *DORIA* ; *Narbonnensium*. Hort. Eyst. The Narbonne Doria.
2. *DORIA* ; *quæ Jacobæa*, *foliis integris & mucronatis*. Mor. Hist. Doria with whole sharp-pointed Leaves.
3. *DORIA* ; *quæ Jacobæa*, *Orientalis*, *limonii folio*. T. Cor. Eastern Doria, with a Sea-Lavender Leaf.
4. *DORIA* ; *Americana*, *lato rigido folio*. Boerb. Ind. American Doria, with a broad stiff Leaf.
5. *DORIA* ; *Africana*, *arborescens*, *crassiss & succulentis foliis*, *atriplicem referentibus*. Boerb. Ind. African Tree Doria, with thick succulent Leaves, somewhat like those of *Atriplex*.
6. *DORIA* ; *quæ Jacobæa*, *Africana*, *hederæ terrestris folio*, *repens*. Hort. Amst. African Creeping Doria, with a Ground-Ivy Leaf.
7. *DORIA* ; *quæ Jacobæa*, *Africana*, *frutescens coronopifolio*. Hort. Amst. African Shrubby Doria, with a Hart's-horn Leaf.
8. *DORIA* ; *quæ Jacobæa*, *Africana*, *frutescens*, *crassiss & succulentis foliis*. Hort. Amst. African Shrubby Doria, with thick succulent Leaves.

The four first Sorts are very hardy, and will endure in the open Air ; these may be propagated by parting of their Roots either in *Spring* or *Autumn*, and will grow in almost any Soil or Situation, but are too large and rambling for a small Flower-Garden, and are seldom preserved except in Botanical Gardens for Variety.

The other four Sorts are beautiful Flowering Plants, and well worth propagating in every good Garden : These are increas'd by planting Cuttings of any of the Kinds during the *Summer* Months, in a Bed of light, rich Earth, observing to water and shade them until they have taken Root : Then you must carefully transplant them into Pots fill'd with the like rich light Earth, setting them in the Shade until they have taken Root ; after which, they may be expos'd with *Geranium's*, &c. until *October*, when they must be remov'd into the Green-house, where they should be plac'd as near the Glasses as possible, that they may have free Air whenever the Weather will permit, and must have frequent Refreshings with Water. These Plants produce their Flowers towards the Latter-end of *Summer*, and continue most part of the *Autumn* in Beauty ; but seldom produce good Seeds with us.

DORONICUM : [Some derive it of *Δωρεῖς* a Gift, or *Palm*, and *Nine Victory*, q. d. a *Triumphant Crown* ; but others will have it deriv'd from an *Arabick* Word.] Leopard's-Bane.

The

The Characters are ;

It hath an intricate knotted Root : The Leaves are produc'd alternately on the Branches : The Stalks are a little branch'd : The Flowers (which grow on the Tops of the Stalks) are radiated like the Greater Starwort : The Half-Florets in the Disk of the Flower are trifid : The Cup of the Flower is expanded, and cut into many Parts almost to the Bottom, and is not scaly, but each single Segment is in the Form of a Dish.

The Species are ;

1. DORONICUM ; *radice, Scorpii*. C. B. Scorpion-rooted Leopards-Bane.
2. DORONICUM ; *plantaginis folio*. C. B. Plantain-leav'd Leopards-Bane.
3. DORONICUM ; *plantaginis folio, alterum*. C. B. Another Plantain-leav'd Leopards-Bane.
4. DORONICUM ; *plantaginis folio, birsutum*. Vaill. Rough Plantain-leav'd Leopards-Bane.

The first of these Plants is sometimes us'd in Medicine with us, as is the third Sort in Germany : These are all Plants of no great Beauty ; but as they will thrive in almost any Soil or Situation, so they may be allow'd a Place in a shady Border, for Variety-sake. They all increase abundantly by their spreading Roots, which may be parted either in Spring or Autumn ; as also by Seeds, which should be sown soon after they are ripe. They produce their Flowers for several Months in the Summer, as in May, June, July, and August, and their Seeds ripen soon after.

DORCIFEROUS PLANTS, [of *Dorsum* the Back, and *fero*, Lat. to bear] such Plants as are of the Capillary Kind, without Stalk, and that bear their Seeds on the Back-side of their Leaves.

DORYCNium, [*Δορύκνιον*, of *Δόρυ*, Gr. a Spear.] Shrub Trefoil.

The Characters are ;

It hath papilionaceous Flowers, which are succeeded by short Pods, in each of which is contain'd one single Seed : To which may be added, the Leaves are single, and divided to the Bottom into five Segments.

We have but one Species of this Plant in England, which is,

DORYCNium ; *Montpelulanum, fruticosum*. J. B. Shrub Trefoil of Montpellier.

This Shrub rises with us to the Height of five or six Feet, and produces Clusters of small Flowers at the Extremity of the slender Branches, which are succeeded by short Pods of Seeds. There is very little Beauty in this Plant, but it is preserv'd in Botanic Gardens for Variety. It may be propagated by sowing the Seeds in the Spring, either on a moderate Hot-bed, or on a warm Border under a Wall, where they will rise very well, and may be afterwards transplanted into Pots, to be shelter'd in Winter ; or if planted in a warm Border and a dry Soil, will endure our common Winters very well in the open Air.

DRACO HERBA, [i. e. *Dragons-wort*.] Tarragon ; *vulgó*.

The Characters are ;

The Leaves, which are like those of Hyssop, are produc'd alternately on the Branches ; the Lower being divided, and the Upper ones are whole : The Flowers are small, discous, and dispos'd into a long Spike.

There is but one Species of this Plant, which is,

DRACO-HERBA. *Ded.* Herb-Dragon, or Tarragon.

This Plant was formerly in great Esteem for Salads and Soops, but at present it is not so much us'd : It propagates itself fast enough by its creeping Roots, which in a short Time will spread very far ; or it may be increas'd by planting Cuttings or Slips in the Spring of the Year ; which, if kept supply'd with Water, will take Root in a short Time. This Plant will grow in almost any Soil or Situation, but best in that which is light and moist.

DRACO ARBOR ; *vide Palma*.

DRACUNCULOIDES, [of *Dracunculus*, Lat. a little Dragon, and *ἰδῶ*, Gr. Form.] Bastard-Dragon.

The Characters are ;

It hath a Root compos'd of many oblong Tubers, like the Asphodel ; from which is produc'd a thick, succulent Foot-stalk, which is spotted like the Dragon : The Leaves are long, broad, and terminate in a Point, being shap'd somewhat like the Musa, but smaller : The Stalk of the Flower arises between the Foot-stalk of the Leaves, which grows tall, upright, and is compress'd ; upon the Top of which is expanded a Cup consisting of six Leaves, in the Centre of which arises many Foot-stalks, which are dispos'd into an Umbel, each sustaining a Flower consisting of six Leaves, which expand in Form of a Lily ; each flower is succeeded by a round Berry, in which is contain'd one single Seed.

There is but one Species of this Plant known at present, which is,

DRACUNCULOIDES. *Boerb. Ind. App.*

This Plant is a Native of a warm Country ; but whether it came from the East or West Indies, I cannot as yet tell ; for it is nowhere mention'd but in Dr. Boerhaave's Catalogue of the Leyden Garden, in which he only gives a short Description of the Plant, but does not take Notice from whence he receiv'd it.

This Plant is propagated by parting the Roots in the Spring of the Year, which should be planted in Pots fill'd with a light sandy Soil, and plung'd into a moderate Hot-bed of Tanner's-Bark to facilitate their taking fresh Root ; after which they may be set into a moderate Stove amongst *Guava's*, *Cereus's*, &c. but should not be expos'd to the open Air : It requires frequent Waterings, especially in Summer, but should not have too much given at once in Winter ; and should be kept pretty warm. It produces its beautiful Flowers in June and July, but seldom perfects its Seeds in our Climate. I receiv'd this Plant from the learned Doctor Boerhaave in the Year 1729, with several

several other curious Plants from the Leyden Garden.

DRACUNCULUS; [*q. d.* Little Dragon.] Dragon.

The Characters are;

The Leaves are like those of Arum, but are divided into many Parts: The Stalk is spotted, but in other respects it agrees with the Arum.

The Species are;

1. **DRACUNCULUS**; *polyphyllus*. C. B. Many-leav'd Dragon.

2. **DRACUNCULUS**; *polyphyllus*; *foliis ex luteo variegatis*. H. R. Par. The yellow strip'd-leav'd Dragon.

3. **DRACUNCULUS**; *polyphyllus*; *foliis ex albo variegatis*. The white strip'd-leav'd Dragon.

The first of these Sorts is cultivated in Gardens for medicinal Uses; the other two are Varieties of the first, which are preserv'd in curious Gardens of Plants. These, tho' they are Plants of no great Beauty, yet for the surprising Oddness of their Flowers, together with their spotted Stalks, do deserve a Place in some remote Corner of the Garden.

They are propagated by their knobby Roots, which, if suffer'd to remain two or three Years undisturb'd, will afford many Off-sets. The best Season for transplanting these Roots is in Autumn, soon after the green Leaves decay; for if they are remov'd after they have taken fresh Root, and began to shoot, they seldom produce Flowers the succeeding Summer; or if they do, they are very weak: These will thrive almost in any Soil and Situation, but best in an open Exposure and a light Soil.

DRACUNCULUS PRATENSIS; *vide* Parmica.

DRAGON; *vide* Dracunculus.

DROSION; *vide* Ros Solis.

DULCOMARA; *vide* Solanum.

DUNGS are design'd to repair the Decays of exhausted or worn-out Lands, and to cure the Defects of Land, which are as various in their Qualities as the *Dungs* are that are us'd to meliorate and restore them: Some Lands abound too much in Coldness, Moisture and Heaviness; others again are too light and dry: And so to answer this, some *Dungs* are hot and light, as that of Sheep, Horses, Pigeons, &c. Others again are fat and cooling, as that of Oxen, Cows, Hogs, &c.

And as the Remedies that are to be us'd must be contrary to the Distempers they are to cure, so the *Dung* of Oxen, Cows and Hogs, must be given to clean dry, light Earths, to make them fatter and closer; and hot and dry *Dungs* to meliorate cold, moist and heavy Lands.

There are two peculiar Properties in *Dungs*, the one is to produce a certain sensible Heat, capable of producing of some considerable Effect; which Properties are seldom found but in the *Dungs* of Horses and Mules, while it is

newly made and a little moist: The other Property of *Dung* is, to fasten the Earth, and render it more fruitful.

The *Dung* of Horses and Mules is of admirable Use in Gardens in the Winter-time, because it then animates and enlivens all Things, and supplies the Office which is perform'd by the Heat of the Sun in the Summer-time, affording us all the Novelties of the Spring, as Asparagus, Cucumbers, Radishes, Melons, Salads, &c. Horse-Dung is the best Improvement for cold, jejune Lands that we can procure in any Quantity; but yet, Horse-Dung being us'd alone, or when 'tis too new, is frequently prejudicial to some Lands; and if it be spread thin over Lands in the Summer-time, it is of very little Service, because the Sun drawing out all the Virtue and Goodness of it, renders it little better than Thatch or dry Straw: and tho' too much of it can scarcely be us'd in a Kitchen-Garden for Cabbages, Colliflowers, and all other Plants that grow there, and require abundance of Nourishment, yet it may be a Fault to lay too much of it on Corn-Lands, because it produces abundance of Weeds.

Horse-Dung being of a very hot Nature, is best for cold Lands; and Cow-Dung for hot Lands: and being mix'd together, may make a very good Manure for most Sorts of Soils, and for some they may be mix'd with Mud.

Sheep's-Dung and Deer's-Dung differ not much in their Quality, and are esteem'd by some the best of *Dungs* for cold Clays: Some recommend them to be beat into Powder, and spread very thin over Autumn or Spring Crops, about four or five Loads to an Acre, after the same Manner as Ashes, Malt-dust, &c. are strew'd.

In Flanders, and other Places, they house their Sheep at Night in Places spread with clean Sand, laid about five or six Inches thick; which being laid on fresh every Night, is clear'd out once a Week, and the *Dung* and *Urine* of the Sheep is a very rich Manure, and bears a considerable Price, and is an excellent Manure for stubborn Lands; and Mr. Quinsey is of Opinion, that 'tis the greatest Promoter of Fruitfulness in all Sorts of Ground.

Others recommend Hog's-Dung as the fattest and most beneficial of all Sorts of *Dungs*, and say, that one Load of it will go as far as two Loads of other *Dung*, and that it is the best of all *Dungs* for Fruit-trees, especially for Pear and Apple-Trees in a light Soil, and a very rich *Dung* for Grass.

The *Dung* of Pigeons, Hens and Geese are great Improvers of Meadow or Corn-Land; the first of these being the best superficial Improvement that can be laid on Meadow or Corn-Land: But before it is us'd, it ought to have lain abroad out of the Dove-house some time, that the Air may have a little sweeten'd it, and mollify'd the fiery Heat that is in those *Dungs*.

Especially it is good for cold, wet, clayey Lands; but it ought to be dry'd before it be strew'd, because 'tis naturally apt to clod in Wet, and it should be mix'd with Earth to

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keep it from clinging together, that it may be strew'd thin, being naturally very hot and strong.

Some recommend the *Dung* of Pigeons, and also of other Fowls, as the best Manure for *Asparagus*, *Strawberries*, or any Sorts of Flowers.

Monsieur *Gentil* approves of *Pigeon's-Dung*, as being good for such Trees whose Leaves are apt to turn yellow, if they grow in free Soils that are rather cold than hot, provided the Heat of it has been abated by lying two or three Years in the Dunghil.

This being spread about an Inch thick at the Foot of a Tree, whose Leaves are yellow, and being left there till *March*, he recommends as very useful in cold and moist Soils.

The *Dung* of Poultry being hot and full of Salts, tends much to facilitate Vegetation, and are abundantly quicker in their Operation than the *Dung* of Animals which feed on Herbs.

Sir *Hugh Plat* says, One Load of Grain will enrich Ground more than ten Loads of common *Dung*; which, if it be true, it is rational to suppose, that if simple Grain by only Infusion in the Mixture of Composts, has a very good Effect, it will be more powerful when it has pass'd thro' the Bodies of Animals.

Human Dung is a great Improver of all cold four Lands, and especially if it be mix'd with other *Earths* or *Dungs* to give it a Fermentation.

But there is not any Sort of Manure equal to the Cleansing of *London Streets* for all stubborn clayey Soils, the Parts of which will be better separated, and in a much less Time with this Manure than any other Compost whatever, and where it can be obtain'd, is extremely well worth procuring either for Corn, Grass, or Garden-Land.

DWARF-TREES. These were formerly in much greater Request than they are at present, for though they may have many Advantages to recommend them, yet the Disadvantages attending them do greatly overbalance; and since the introducing of *Espaliers* into the *English Gardens*, *Dwarf-Trees* have been destroy'd in most good Gardens, for the following Reasons.

1st, The Figure of a *Dwarf-Tree* is very often so much studied, that in order to render the Shape beautiful, little Care is taken to procure Fruit, which is the principal Design in planting these Trees.

2dly, The Branches being spread horizontally near the Surface of the Ground, renders it very difficult to dig, or clean the Ground, between them.

3dly, Their taking up too much Room in a Garden, (especially when they are grown to a considerable Size) for nothing can be sown or planted between them,

4thly, These Trees spreading their Branches near the Ground, do continually shade the Surface of the Earth, so that neither the Sun nor Air can pass freely round their Roots and Stems, to dissipate noxious Vapours, whereby the circumambient Air will be continually re-

plete with crude rancid Vapours, which being, drawn in by the Fruit and Leaves, will render its Juices crude and unwholesome as well as ill-tasted.

These Evils being intirely remedied by training the Trees to an *Espalier*, hath justly gain'd them the Preference; however, if any one has a Mind to have *Dwarf-Trees*, notwithstanding what has been said, I shall lay down a few Rules for their Management.

If you design to have *Dwarf Pear-Trees*, you should bud or graft them on *Quince-Stocks*; for Free Stocks are apt to make them shoot so vigorously, as not to be kept within Bounds: These Grafts or Buds should be put in about four or six Inches above the Surface of the Ground, that the Heads of the Trees may not be advanc'd too high; and when the Bud or Graft has shot out four Eyes, you should stop the Shoot, to force out lateral Branches.

Two Years after Budding these Trees will be fit to transplant where they are to remain; for tho' many People chuse to plant Trees of a greater Age, yet they seldom succeed so well as young ones. The Distance these Trees should be planted is twenty Foot square, for less will not do, if the Trees thrive well: The Ground between them may be cultivated for Kitchen-Garden Herbs, while the Trees are young, but you should not sow or plant too near their Roots.

In order to train your Trees regularly, you should drive Stakes into the Ground round the Tree, to which the Branches should be nail'd down with Lint in an horizontal Position; for if they are suffer'd to take a perpendicular Figure while young, they can't be afterwards reduc'd without great Violence to any tolerable Figure. The necessary Directions to be afterwards follow'd are, not to suffer any Branches to cross each other; and always in shortning any, be sure to leave the uppermost outwards, whereby the Hollowness in the Middle of the Tree will be better preserv'd, and be careful to rub off all perpendicular Shoots in the Middle of the Trees, so soon as they are produc'd. The other necessary Rules you'll find under the Article of Pruning.

The Sorts of *Pears* which do best in *Dwarfs*, are all *Summer* and *Autumn* Fruits; for *Winter Pears* are not worth planting in *Dwarfs*, for they seldom bear well, nor are ever well-tasted, and commonly are very stony.

Apples are also planted in *Dwarfs*, most of which are now budded or grafted on *Paradise Stocks*; but as these are for the most part of a short Duration, so they are not profitable, and are fit only for small Gardens, as a Matter of Curiosity, producing Fruit sooner and in greater Plenty, than when they are upon *Crab* or *Apple Stocks*.

The Distance these Trees should be planted, if on *Paradise Stocks*, should be six Feet; but if on *Crab Stocks*, sixteen Feet asunder each Way. The Management of this being the same with *Pears*, I need not repeat it.

Some Persons also plant *Apricocks* and *Plumbs* for *Dwarfs*, but these seldom succeed well, as being of a tender Constitution; and those which

which will produce Fruit on *Dwarfs*, are much more likely to do so when train'd on an *Espalier*, where they can be much better manag'd, and therefore I judge it much the better Method, as being more certain, and the Trees will make a better Figure.



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EARTH is the principal Matter whereof our Globe consists; the Character of which, according to Dr. Boerhaave, is, That it is a *Fossil Body*, neither dissoluble by Fire, Water, nor Air; that it is insipid, and transparent; more fusible than Stone; still friable, and containing usually a Share of Fatness.

There is no such thing as a strictly simple Earth; Mr. Boyle says, That it does not appear, that Nature any more than Art affords an elementary Earth; at least, some which appear of the simplest Sorts are found, upon Examination, to have Qualities not ascrib'd to pure Earth.

Of such Earths, some are simple, and immutable, as Chalk, Pumice, and rotten Stone; others compound and fatty; of which kind are all Boles, red, white and brown; Fullers Earth; and divers Kinds of Medicinal Earths, as the Cretica, Hungarica, Lemnian Earth, and others.

Which Earths are all resolvable into Oil, a little acid Salt, &c. and a Calx, which is the Basis, or the Earth properly so call'd.

Sand is by Naturalists generally rank'd as a Species of Earth, tho' not very properly. In that Sands, strictly speaking, are a Sort of Crystals, or little transparent Pebbles, and are calcinable, and by the Addition of a fix'd Alkaline Salt, fusible and convertible into Glass.

The fat Earth is render'd fertile by the Means of Sand, and becomes fit to feed and nourish Vegetables, &c. for pure Earth is liable to coalesce into a hard coherent Mass, as in Clay; and Earth thus imbodyed, and as it were glud together, would be very unfit for the Nourishment of Plants.

But if hard Sand, i. e. Crystals, which are indissoluble in Water, and still retain the same Figure, be intermix'd with such Earth, they will keep the Pores of the Earth open, and the Earth it self loose and incompact, and by that means give Room for the Juices to move, ascend, &c. and for Plants to be nourish'd thereby.

Thus a Vegetable being planted either in the Sand alone, or in the fat Glebe and Earth alone, receives no Growth or Increment, but is either starv'd or suffocated; but mix the two, and the Mass becomes fertile.

In effect, by means of Sand the Earth is render'd, in some measure, Organical, Pores

and Interstices being hereby maintain'd or preserv'd, something analagous to Vessels is effected; by which the Juices of the Earth may be convey'd, prepar'd, digested, circulated, and at length excern'd and thrown off in the Roots of Plants.

The Earth is made up of two Parts: The first the containing Part, i. e. the Body, Bed or Couch; the second Part contain'd, and those are the nitrous or sulphureous Particles or prolifick Salts. The first is a lifeless inanimate Mass, and is only the Receptracle of the other: For the Earth consider'd simply, and abstracted from the before mention'd nitrous and prolifick Salts, is a lifeless, dead and inanimate Mass; but by the Co-operation of Water, Sun and Air, is put into Motion, and promotes the Work of Vegetation: But if it were stript of those prolifick Salts and spirituous Particles, would produce no manner of Plant, Herb, &c. that should be planted or sown in it.

These nitrous Particles or prolifick Salts, are of various and different Qualities, and according as the Earth is more or less stor'd with all or some of them, it is more or less productive; and according as it abounds with some of them more than others, differing from one another in Contexture, it constitutes the different Species or Kinds of Soils adapted to the Propagation of different Plants, the Pores of whose Roots are form'd to receive, and whose Nature is to attract those Salts that are congenial to them.

Some distinguish Earths into three Classes, Sand, Loam, and Clay; as those upon one or other of which all others do in some respects depend.

Gravel, and all the open Soils, till the Loam is come at, are of the sandy kind.

Those binding Earths from the Loam downwards, till the Stiffness of Chalk may become at, may be reckon'd of the Clay kind.

All these Sorts of Earths have a little Tendency to Vegetation, and have their Salts proper for it, but in a different Proportion; as a Peck of Clay may probably have double the Quantity of Salts in it that a Peck of Loam has; and a Peck of Loam may have twice the Quantity of Salts that a Peck of Sand has.

Loam. Some call the superficial Earth that we meet with in England by this Name, without having Regard to what Proportions of Sand and Clay it contains: Others again call that Earth Loam that inclines more to Clay than Sand: Some by Loam mean that Sort of Earth that equally partakes of Sand and Clay, being a Medium between Sand and Clay, which they call Mother-Earth.

This Mother-Earth, they say, may be in Colour either black or yellow, and of which of these Colours soever it be, Plants of all Sorts will grow in it.

Sand and Clay likewise produce certain Plants which are natural to each of them, and consequently will thrive better in them than in any other Soil.

But Sand is apt to precipitate those Plants that are set in it, earlier than Clay, and will

will cause them to germinate near a Month sooner than those that grow in *Clay*, and that for this Reason, that the *Salts* which are in the *Sand* are liable to be put in Motion by the least Approach of the Warmth of the Sun; but as *Sand* is quick in the Operation, so the *Salts* are soon exhald and spent.

Clay: The Parts of *Clay* are more closely compacted together, and do not so easily give out those *Salts* that are contain'd in it; nor can the Fibres of every tender Plant make their Way through it in quest of their proper Nutriment.

But if the Parts of the *Clay* be open'd, by digging and breaking it into small Particles, and those Parts be kept open by a Mixture of some sharp *Sand*, or some other Body of the like Quality, the Effects of its Vigour will plainly appear.

Some distinguish the several Temperaments of the *Earth* either into a *light*, *sandy*, or *loose* Contexture, or into those of a *stiff*, *clayey*, or *close* one; either of which have their respective good Qualities, and all of them, when they are in their Extremes, require Art to render them useful and beneficial in the Production and Growth of Plants.

A *light*, *sandy*, or *loose* *Earth* requires a proper Ligature, and should have a Compost of a heavier Nature; and those that are *heavy*, *clayey*, and *cloddy*, should have a Compost of a more fiery, sprightly Nature, that will insinuate itself into the *heavy*, *lumpy*, *indigested* *Clods*, which would otherwise very much obstruct the Business of Vegetation.

Some Authors who treat of the Qualities of *Earth*, say, a good *Earth* should be of a *blackish* Colour, *gravelly*, *fat*, *pliant* or *easy* to be digg'd, and that it should be neither *cold* nor *light*; that it ought to have no ill Smell nor Taste; and that it ought to be of the same Quality three or four Feet deep for Trees, which, if they have not that Depth, will languish and decay, after they have been planted six Years. But this is not true in Fact; for most Trees will thrive very well, if they have two Foot Depth of good *Earth*, especially Fruit-Trees, which produce the most generous Fruits when their Roots spread near the Surface of the *Earth*.

In order to know whether the *Earth* has any ill Smell or Taste, they direct, to lay a Handful of it to soak in Water for seven or eight Hours, and afterwards to strain it, and taste and smell it; by which, the Taste or Smell will easily be perceiv'd.

EARWIGS.

These are very troublesome Vermin in a Garden, especially where *Carnations* are preserved; for they are so fond of these Flowers, that if care is not taken to prevent them, they will intirely destroy them, by eating off the sweet Part at the Bottom of the Leaves. To prevent which, most People have Stands erected, which have a Basen of *Earth* or *Lead* round each Supporter, which is constantly kept fill'd with Water. See the Article *Carnation*.

Others hang the hollow Claws of Crabs and Lobsters upon Sticks in divers Parts of the Garden into which these Vermin get; and by often searching them, you will destroy them without much Trouble; which will be of great Service to your Wall-Fruit, for these are great Destroyers thereof.

EBULUS; *five* Sambucus Humilis.

ECHINATE SEEDS; [of *Echinus*, Lat. a *Hedge-hog*] such Seeds of Plants as are prickly and rough.

ECHYNOMELOCACTUS; *vide* Mole-cactus.

ECHINOPHORA; [of *'Exiv* a *Hedge-hog*, and *phor*, Gr. to bear.] Prickly-headed Parsnip.

The Characters are;

The Cup of the Flower consists of one Leaf, which is divided into five Parts, and expands in Form of a Star, in which is included the Foot-stalk of the Umbel: The Fruit consists of one prickly Vessel, in which is contain'd one long Seed.

We have but one Specie of this Plant, which is,

ECHINOPHORA; *pastinace folio*. C. B. *Echinophora* with a Parsnip-Leaf.

There is no great Use or Beauty in this Plant; but it is preserv'd in curious Botanick Gardens, for Variety-sake. It may be propagated by sowing the Seeds soon after they are ripe, or very early in the Spring; and when the Plants are come up, they should be singled out, so as to remain about eight or ten Inches asunder. The second Year after sowing they will produce ripe Seeds.

ECHINOPUS; [of *'Exiv* a *Hedge-hog*, because the Heads of this Plant resemble this Animal, and are untractable like to it.] Globe-Thistle; *vulgô*.

The Characters are;

It hath the whole Appearance of a Thistle: The Leaves are produc'd alternately: The Florets consist of one Leaf, which is divided into five Segments, and is hollow; and each single Floret has a scaly Cup: The Flowers are collected into a spherical Head, which has no common Cup or Covering.

The Species are;

1. ECHINOPUS; *major*. J. B. Greater Globe-Thistle.

2. ECHINOPUS; *major, humilior, floribus albidis*. Flor. Bat. Greater Dwarf Globe-Thistle, with whitish Flowers.

3. ECHINOPUS; *minor, annuus, capite magno*. Tourn. Lesser annual Globe-Thistle, with a large Head.

The first of these Plants hath been an old Inhabitant of the *English* Gardens, where it hath had a Place more for Variety, than any particular Beauty.

The second Sort is a Variety which hath been obtain'd from Seeds of the former. These Plants may be propagated by sowing their Seeds in the Spring of the Year in a light Soil: and when the Plants are strong enough to

to remove, they may be transplanted into the Middle of large Borders, or in any abject Part of the Garden; for they are too large to stand amongst nicer Plants, which would be greatly injured by their large Leaves. The second Year after sowing they will produce Flowers; and if the Autumn is not too cold or wet, will perfect Seeds: but the Roots of these will abide three or four Years, and produce Flowers and Seeds annually.

The third Sort is an annual Plant, and requires to be sown early, as also to have an open warm Situation; otherwise it will not produce good Seeds in this Country. This Plant is of small Growth, and so may the better be preserv'd in a warm Border amongst other curious Plants.

ECHINUS; *Lat.* is the prickly Head, Cover of the Seed, or Top of any Plant; so call'd, from its Likeness to a Hedge-hog.

ECHIUM; [*of 'Eχλε, Gr. a Viper, because the ripe Seed of this Plant resembles the Head of a Viper. It is call'd Herba Viperaria, because the Antients believ'd that this Plant kill'd Vipers.*] Vipers Bugloss.

The Characters are;

The Cup of the Flower is large, and divided into five long slender Segments: The Flower consists of one Leaf, is shap'd like a Funnel, and somewhat inflexed, having its upper part stretch'd out to a greater Length than the lower: The upper part or Galea of the Flower is divided into two, and the lower part or Beard into three Parts: In the Middle of the Flower are produc'd five Stamina (or Threads) which are reflex'd: Each Flower is succeeded by four Seeds, which are in Form of a Viper's Head.

The Species are;

1. **ECHIUM. C. B. Common Vipers Bugloss.**
2. **ECHIUM; majus, & asperius, flore albo. C. B. Great rough Vipers Bugloss, with a white Flower.**
3. **ECHIUM; majus, & asperius, flore dilute purpureo. Bot. Monsp. Great rough Vipers Bugloss, with a Flower of a pale purple Colour.**
4. **ECHIUM; amplissimo folio, Lusitanicum. Tourn. Portugal Vipers Bugloss, with a large Leaf.**
5. **ECHIUM; Creticum, latifolium, rubrum. C. B. Broad-leav'd Candia Vipers Bugloss, with a red Flower.**
6. **ECHIUM; Creticum, angustifolium, rubrum. C. B. Narrow-leav'd Candia Vipers Bugloss, with a red Flower.**
7. **ECHIUM; foliis angustis & villosis. Tourn. Vipers Bugloss, with narrow hairy Leaves.**

There are several other Varieties of this Plant, which are preserv'd in curious Botanick Gardens; but these here mention'd are the chief Sorts which I have observ'd in England. The first Sort is found wild upon dry chalky Hills and gravelly Soils in divers Parts of England, and is sometimes used in Medicine: But there are none of the Varieties which are cultivated for their Beauty; tho' I think the first, fifth, and sixth Sorts do deserve a Place in some dry abject Part of the Garden, where little else will grow, for the sake of Variety,

and the long Continuance of their Flowers. They are most of them Biennial Plants, the Seeds being sown in the Spring, will the second Summer after produce Flowers and Seeds, after which they seldom continue: They all delight in a rubbishy gravelly Soil, and will grow upon the Tops of old Walls or Buildings, where when once they have establish'd themselves, they will drop their Seeds, and thereby maintain a Succession of Plants without any Care; and on these Places they appear very beautiful.

EDERA QUINQUEFOLIA; *vide Vitis.*

EDGINGS. The best and most durable Plant for Edgings in a Garden is *Box*, which if well planted, and rightly manag'd, will continue in Beauty for several Years: The best Season for planting this, is either in the Autumn, or very early in the Spring; for if you plant it late, and the Season should prove hot and dry, it will be very subject to miscarry, unless great Care is taken to supply it with Water. The best Sort for this Purpose is the *Dwarf Dutch-Box*.

These Edgings are only planted upon the Sides of Borders next Walks, and not (as the Fashion some Years ago) to plant the Edgings of Flower-beds, or the Edges of Fruit-borders in the Middle of Gardens, unless they have a Gravel Walk between them, which renders it proper to preserve the Walks clean, by keeping the Earth of the Borders from washing down in hard Rains.

It was also the Practice formerly, to plant Edgings of divers Sorts of Aromatick Herbs, as *Thyme, Savory, Hyssop, Lavender, &c.* But these being subject to grow woody, so that they can't be kept in due Compass, and in hard Winters being often kill'd in Patches, whereby the Edgings are render'd incomplete, they are now seldom us'd for this Purpose.

Some People also make Edgings of *Daisies, Thrift, Catch-fly*, and other flowering Plants; but these also will require to be transplanted every Year, in order to have them handsome, for they soon grow out of Form, and are subject also to decay in Patches, so that there is not any Plant which so compleatly answers the Design as *Dwarf-Box*, which must be prefer'd to all others.

EFFLORESCENTE, Lat. The Blowing out of a Flower.

To EGERMINATE, Lat. To bud or spring out.

ELATERIUM; [*ελατήριον, of ελαύνω, Gr. to agitate, as tho' a bent Bow which returns to its former State: Or it is so call'd of its Fruit, which if it be touch'd lightly, scatters it self; but the ripe Fruit is carefully to be gather'd between Cloths, or in a Pitcher, that it may discharge it self in that, that it may not affect the Eyes.*] The Wild Cucumber.

The Characters are;

The Branches are somewhat like those of the Cucumber, but have no Tendrils: The Fruit is prickly,

prickly, and when ripe, burst with great Elasticity, and abounds with fetid Juice.

We have but one Species of this Plant, which is,

ELATERIUM; officinarum. Boerh. Ind. This is the *Cucumis sylvestris*, *Asinum*, *diſtum*, of Caspar Bauhin.

This Plant is cultivated in some Gardens for Medicinal Use, but is chiefly preserv'd in curious Gardens for its Variety, as also for Diversion; for when the Fruit is ripe, if you offer to gather it, it bursts and casts its Juice and Seeds with great Elasticity, for which it is call'd by some *Noli me Tangere*, or, *Touch me not*: Which Appellation may be given to many other Plants on this Account.

It may be propagated by sowing the Seeds in the Spring of the Year in an open warm Border; and when the Plants are come up, they may be transplanted into open Beds or Borders, about 6 or 8 Feet Distance from each other, for the Vines will spread very far, especially if the Ground is good in which they are planted: These produce their Fruit in Autumn, which if you suffer to fall off, and emit their Seeds, will afford a plentiful Supply of Plants without any farther Care.

ELATINE; vide *Linaria*.

ELICHRYSUM, or **HELIOCHRYSON**: [*ελιχρυσον* is compos'd of *ηλιος*, *Sol*, the Sun; and of *χρυς*, *Aurum*, Gold, because the Cup of the Flower is for the most part of a Gold-colour.] **Eternal Flower**.

The Characters are;

The Disk of the Flower contains many hermaphrodite Florets; in the Center of each of these arises the Ovary, which is crown'd with Hairs, and is supported by a naked Placenta: These are all contain'd in a scaly Cup, which consists of dry Membranes, and is, for the most part, of a splendid Colour.

The Species are;

1. **ELICHRYSUM**; seu *stachas citrina*, *angustifolia*. C. B. Goldyllocks, or Cassidony.

2. **ELICHRYSUM**; *montanum*, *flore rotundiori*, *candido*. Tourn. Cats-foot, or Mountain Cassidony, with a white round Flower.

3. **ELICHRYSUM**; *montanum*, *flore rotundiori*, *variegato*. Tourn. Cats-foot, or Mountain Cassidony, with a round variegated Flower.

4. **ELICHRYSUM**; *Americanum*, *latifolium*. Tourn. Broad-leav'd American Eternal-Flower.

5. **ELICHRYSUM**; *sylvestre*, *latifolium*, *flore parvo*, *singulari*. Tourn. Broad-leav'd wild Eternal-Flower, with a small single Flower.

6. **ELICHRYSUM**; *sylvestre*, *latifolium*, *flore magno*, *singulari*. Tourn. Broad-leav'd wild Eternal-Flower, with a single large Flower.

7. **ELICHRYSUM**; *sylvestre*, *latifolium*, *capitulis conglobatis*. C. B. Broad-leav'd wild Eternal-Flower, with many Heads closely united.

8. **ELICHRYSUM**; *flore suave rubente*. Hort. Cath. Eternal-Flower, with a soft Red colour'd Flower.

9. **ELICHRYSUM**; *Africanum*, *fetidissimum*, *amplissimo folio*, *calice argenteo*. Tourn. Stinking

African Eternal-Flower, with a broad Leaf and a Silver-colour'd Cup.

10. **ELICHRYSUM**; *Africanum*, *fetidissimum*, *amplissimo folio*, *calice aureo*. Tourn. Stinking African Eternal-Flower, with a broad Leaf and a Gold-colour'd Cup.

11. **ELICHRYSUM**; *Orientele*. C. B. Eastern Eternal-Flower.

12. **ELICHRYSUM**; *arborescens*, *Africanum*, *salvia folio*, *odorato*. Boerh. Ind. African-Tree Eternal-Flower, with a sweet-smelling Sage-Leaf.

13. **ELICHRYSUM**; *Africanum*, *folio oblongo*, *subtus incano*, *supra viridi*, *flore luteo*. Boerh. Ind. African Eternal-Flower, with a longish Leaf, hoary underneath, but green on the upper Part, and a yellow Flower.

14. **ELICHRYSUM**; *Africanum*, *frutescens*, *foliis Crithmi Marini*. Hort. Amst. Shrubby African Eternal Flower, with Leaves like the Samphire.

15. **ELICHRYSUM**; *Africanum*, *frutescens*, *foliis stachados citrinae*, *flore aureo*. Boerh. Ind. Shrubby African Eternal-Flower, with Leaves like the Golden Cassidony.

16. **ELICHRYSUM**; *Africanum lanuginosum*, *latifolium*, *calice floris argenteo*, & *amplissimo*. Olden. Woolly African Broad-leav'd Eternal-Flower, with an ample Silver-colour'd Cup.

17. **ELICHRYSUM**; *Africanum*, *tomentosum*, *frutescens*, *calice argenteo*. Com. Pl. Rar. African shrubby Eternal-Flower, with woolly Leaves and a Silver-colour'd Flower-Cup.

18. **ELICHRYSUM**; *Africanum*, *frutescens*, *angustis & longioribus foliis incanis*. Hort. Amst. Shrubby African Eternal-Flower, with long narrow hoary Leaves.

The first of these Sorts hath no great Beauty, but it being a medicinal Plant is preserv'd in Physick Gardens. This seldom produces good Seeds in England, but is very easily propagated by planting Slips or Cuttings in a shady Border, any time from April to August; which, if carefully supply'd with Water, will push out Roots in a Month's time, and may then be remov'd to the Place where it is to remain for good.

This delights in a dry warm Soil, that is not too rich; for if the Soil be wet, or over-dung'd, it will cause this Plant to make stronger Shoots in Summer, but then it will be liable to be destroy'd with a little cold Weather in Winter. This Plant may be train'd up to a regular Head, if proper Care be taken of it while young, and will grow to the Height of three or four Feet.

The second and third Sorts are Inhabitants of the Northern Mountains, in Yorkshire, Cumberland, &c. These Plants grow very close to the Ground, and increase very fast from the Off-sets which are produc'd in great Plenty on every Side the Plants, which emit Roots from their Joints as they trail upon the Ground, so that in a short time they will overspread the Ground where they are planted.

These Plants produce small Bunches of soft dry Flowers, which if gather'd when they are in Beauty, and preserv'd in a dry Place, will continue

continue fresh and fair for some Years, for which Reason they deserve a Place in every good Garden, to increase the Varieties of these Flowers, which will afford Pleasure at a Season when the Ground is so lock'd up, that none of the flowery Tribe abroad appears above-ground. These Plants will grow in a shady dry place in any remote Part of a Garden, and are by some planted for Edgings to North Borders.

The fourth Sort is a great Rambler in a Garden, and should therefore be either confin'd to Pots, or planted in some abject Part of the Garden, in a Place by it self, for if it stand near any other Plants or Flowers, it will be apt to over-run and destroy them; for the Roots creep far under-ground, and will arise at a great Distance from the old Plant: But however as the Flowers are very beautiful amongst others of the perpetual Kind, they should not be wanting in a good Garden. This though stil'd an *American* Plant, yet is thought to be a Native of some of the warm *European* Countries. It delights in a dry warm Soil, and increases plentifully by the Off-sets.

The fifth and sixth Sorts are Plants of no great Beauty: They are preserv'd in *Botanick* Gardens for Variety Sake, but are seldom cultivated in Gardens for Pleasure. They may be propagated either by sowing their Seeds in the Spring on a moderate Hot-bed, or by planting Cuttings or Slips in any of the Summer Months: But these Plants producing Seeds in plenty, it is the common Method to increase or maintain them by Seeds. These must be planted in Pots fill'd with light sandy Earth, and must be shelter'd in Winter, giving them as much free open Air as possible in mild Weather, and often refreshing them with Water: With this Management they may be train'd up to the Height of three or four Feet, and will grow shrubby; but if suffer'd to remain abroad, they will not survive the Winter.

The seventh Sort is an Annual, and is a Plant of very little Beauty, and is only preserv'd for Variety, and will require no farther Care than to suffer the Seeds to fall upon the Ground, which will arise, and afford an abundant Supply of Plants.

The eighth Sort is an abiding Plant, which deserves a Place in the most curious Gardens for the Beauty of its Flowers. This is propagated by planting Cuttings in any of the Summer Months, which should be put into Pots fill'd with light sandy Soil, and plung'd into a moderate Hot-bed, to facilitate their Rooting; after which they may be expos'd to the open Air, and some of them may be planted into a warm dry Border, where they will endure the Cold of our ordinary Winters without any Shelter; but 'tis adviseable always to preserve some in Pots under Cover in Winter, lest those abroad should be destroy'd, as it sometimes happens in very severe Frosts.

This Plant producing Flowers which are of a fine soft red Colour, are a very great Ornament in Winter, when intermix'd with the several Varieties of Eternal Flowers, in Glasses

or Basons fill'd with dry Sand, which being preserv'd from Wet, will afford a great deal of Pleasure, when other Flowers are not to be procur'd.

The ninth and tenth Sorts are Biennial Plants. These seldom continue after they have flower'd and produc'd Seeds. They may be sown in the *Spring* upon a warm and dry Border; and when the Plants are come up pretty strong, they may be transplanted out either into Pots or in warm Borders, allowing them at least eight or ten Inches Room; for when they grow strong, they shoot out many Branches from their Sides, and produce Bunches of dry Flowers like the other Plants of this kind, which being preserv'd, do add to the Variety.

But these Plants while fresh, do emit a violent strong Smell upon the least Touch, for which they have been by many People rejected. They will endure our ordinary Winters in the open Air, if planted in a dry Soil; but in severe Cold, are apt to be demolish'd.

The eleventh Sort is one of the most beautiful of all this Tribe, producing large Bunches of bright Yellow-colour'd Flowers. This is preserv'd in *Portugal* and *Spain* for adorning their Places of Worship in the Winter-season, as also for the Ladies to adorn their Heads; for which Purposes it is preferable to any of the Flowery Tribe.

This Plant seldom produces Seeds in *England*, but is propagated by planting Cuttings in the Summer-season, which must be set in Pots of light Earth, and plung'd into a moderate Hot-bed, to facilitate their striking root; then you must put each Plant into a separate Pot fill'd with the like fresh Earth, and during the Summer-Season you may expose them with *Oranges*, *Myrtles*, &c. but in Winter they must be put either under a Hot-bed Frame, or into an airy Green-house, placing them near the Windows, that they may enjoy the free Air, whenever the Weather will permit the Glasses to be open'd; for if they are crowded amongst other Plants, they are apt to draw, and their under Branches and Leaves, will rot and decay: It must also have frequent, but gentle Waterings. This produces its Flowers in *May*, which when fully grown, shou'd be cut, and preserv'd in clean white Papers, and kept from the Air, which greatly diminishes their Beauty: And this cutting off the Flowers will cause them to push out many Side-shoots, whereby the Plant may be increas'd.

The twelfth Sort grows to be a very large Tree, where it hath the Advantage of a warm Climate, that it may be planted in the full Ground: And here in *England* there are several Trees of pretty large Growth: We have some in the *Physick* Garden, which are upward of twelve Feet high, and have considerable Stems, and fine regular Heads, to which they may be easily train'd, provided Care be taken in their Direction while young.

This is propagated by planting Cuttings, as was directed for the former Sort, and requires to have a fresh light Soil, and frequent Waterings: In Winter it must be hous'd with *Bays* and

and other hardy Kinds of Ever-greens, where it may have free open Air in mild Weather. I have sometimes known Plants of this kind endure abroad in moderate Winters; but in severe Cold they never escape.

The 14th, 15th, 16th, 17th, and 18th Sorts are all propagated by Cuttings, as was before directed. These may be train'd up to Shrubs with regular Stems, and will grow to the Height of six or seven Feet: They are pretty hardy, and require only to be secur'd from our severe Frosts, and must have free open Air and frequent Waterings in mild Weather. These are all pretty Varieties in Collections of Exotick Plants, and altho' some of the Flowers have no great Beauty in them, yet they are worth preserving, for the sake of Variety.

ELM; *vide* Ulmus.

EMERUS; [This Name was given it by Theophrastus, and restor'd by Casalpini: It is by others call'd *Colutea*.] Scorpion Sena; *vulgô*.

The Characters are;

It hath Leaves like those of the *Colutea*: The Flowers are papilionaceous: The Pods are slender, and contain two or three Cylindrical-shap'd Seeds in each.

The Species are;

1. EMERUS; *Casalp.* Scorpion Sena; *vulgô*.
2. EMERUS; *minor.* Tourn. The lesser Scorpion Sena.

The first of these Shrubs is very common in all the Nurseries near London, but the second is at present in very few Gardens; these are both of them extreme fine Flowering Shrubs and are great Ornaments to smaller Wilderness Quarters of Shrubs which are of equal Growth. The first will rise to the Height of seven or eight Feet, and may be reduced to a regular Figure, if proper Care be taken while they are young. The second seldom rises above two or three Feet high, but may be train'd into a handsome Figure. These Shrubs continue Flowering through the greatest part of the Summer; therefore the best Season to prune them, in order to reduce them into Shape, is about the Middle of September, soon after they have done flowering; for if you cut them in Summer, it will prevent their Flowering in Autumn, unless it be done in May, which will destroy the first Crop of Flowers, and prevent their producing Seeds.

These Shrubs are easily propagated by sowing their Seeds (which they commonly produce in great Plenty) in March upon a Bed of light sandy Earth, observing to keep the Bed clear from Weeds; and in very dry Weather you must often refresh the Bed with Water, which should be given carefully, lest the Seeds should be wash'd out of the Ground by hasty watering. When the Plants are come up, you must continue the same Care; and the Michaelmas following (if your Plants have thriven well) you may draw out the largest, which may be transplanted into a Nursery, at three Feet Distance Row from Row, and one

Foot asunder in the Rows; this will give Room to those Plants which are left to grow in the Seed-bed, in which Place they may remain another Year, when they will also be fit to transplant into a Nursery, where they should be train'd up in the manner you design them to grow, either in round Heads, or in rude Plants: In two or three Years more they will be fit to plant out, where they are to remain for good; in doing of which, you should be careful, in taking them up, not to break or wound the Roots: nor should they remain too long in the Nursery before they are transplanted; for they are subject to shoot down-right Roots, which, when cut off, oft-times proves the Death of the Tree. In all other respects it must be treated like other Flowering Shrubs, amongst which, this is commonly sold at the Nurseries. It delights in a dry Soil; and may also be propagated by laying down the tender Branches, which will take Root in about a Year's time, and may then be transplanted into a Nursery, and managed in the same manner as the Seedlings.

EMPETRUM; [*Ἐμπέτρον*, of *ἔμπετρον*, Gr. a Rock or Stone, because this Tree grows in Stony Places.] Black-berry'd Heath.

The Characters are;

It hath Leaves like those of the Heath: The Flowers are Male and Female, which grow in different Parts of the same Plant: The Male Flowers have no Petals: The Female Flowers are succeeded by Black-berries, in each of which is contain'd three or four hard Seeds.

We have but one Specie of this Plant in England, which is,

EMPETRUM, *montanum*, *fructu nigro.* Tourn. Black-berry'd Heath, Crow-berries, or Crake-berries.

This little Shrub grows wild upon the Mountains of Staffordshire, Derbyshire, and Yorkshire, and is seldom propagated in Gardens, unless for Variety-sake: but it may be cultivated in shady Places where the Soil is stiff in Gardens, and will thrive very well; and may be propagated by sowing the Seeds, soon after they are ripe, in a moist shady Place, which should be kept clear from Weeds, and suffer'd to remain undisturb'd until the second Year, at which time the Plants will come up, and the Year following may be transplanted where they are to remain, and will require no farther Care than to clear them from Weeds.

EMUSCATION; the Clearing a Tree of Moss. *Lat.*

ENUCLEATION; a Taking-out the Nut or Kernel of any Fruit. *Lat.*

ENULA CAMPANA; *vide* Helenium.

EPHEMERON; [*Ἐφῆμερον* of *ἔμπετρον* and *ἡμέρα*, Gr. a Day, because the Flowers of this Plant seldom continue longer blown than one Day.] Virginian Spider-wort; *vulgô*.

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The Characters are;

The Cup of the Flower consists of three Leaves: The Flower also hath three Petals, which expand in form of a Rose, and have three Stamina (or Threads) which surround the Ovary: The Fruit is oblong, and divided into three Cells, which are fill'd with Seeds like a Grain of Wheat.

The Species are;

1. EPHEMERUM; *Virginianum, flore cœruleo majori. Tourn.* Virginian Spider-wort, with a large blue Flower.

2. EPHEMERUM; *Virginianum, flore purpureo majori. Tourn.* Virginian Spider-wort, with a large purple Flower.

3. EPHEMERUM; *Virginianum, flore azureo majori. Tourn.* Virginian Spider-wort, with a large azure Flower, commonly call'd the Savoy Spider-wort.

4. EPHEMERUM; *Virginianum, flore cœruleo minore. Tourn.* Virginian Spider-wort, with a small blue Flower, commonly called John Tradescant's Spider-wort.

5. EPHEMERUM; *Virginianum, flore albo Tourn.* Virginian Spider-wort, with a white Flower.

6. EPHEMERUM; *Virginianum, flore purpureo minore. Tourn.* Virginian Spider-wort, with a small purple Flower.

The several Varieties of this Plant are easily propagated, by parting their Roots either in Spring or Autumn; and should be planted in a moist Soil, where they will thrive and increase exceedingly, and are extreme hardy, enduring our severest Cold in the open Air.

These are very proper for large Borders, where they may have Room to grow: but if they are planted in small Borders, they should be parted into small Heads every Year, otherwise they will grow too large for such Places. They may be planted in shady Borders, where their Flowers will continue longer than if expos'd too much to the great Heat of the Sun. This Flower seldom survives the Day, but is succeeded by new ones daily, for several Months; so that it may deserve a Place for the long Continuance of its Flowering.

EPIMEDIUM, [*Ἐπίμηδον*, of *ἐπὶ* and *μήδω*, q. d. over-and-above Three-leav'd, as tho' the Great Trefoil, because the Leaves of this Plant are large, and always by Threes.] Barren-wort.

The Characters are;

The Stalks are divided into three Branches, each single Branch sustaining three Leaves, which are shap'd somewhat like Ivy: The Calix consists of four Leaves: The Flower consists of four Petals, which are hollow, and expand in form of a Cross: The Pointal of the Flower becomes a Pod with one Cell, having two Valves, in which is contain'd round flat Seeds.

We have but one Species of this Plant at present in England, which is,

EPIMEDIUM. C. B. Barren-wort.

This is a Plant of no great Beauty, yet, for Diversity, may have a Place in a Garden: It is easily propagated, by parting the Roots (which increase very fast under ground) either in the Spring or Autumn, and should be planted

in a moist Soil, and a shady Situation. This Plant produces its Flowers in May, but seldom ripens Seeds with us: this may be owing to its spreading Roots, which exhaust the Nourishment from the Flowers and Fruit, and might, perhaps, be procur'd, by confining the Roots to a Pot. The Roots thereof, if planted in a good Border, should be every Year reduc'd, so as to keep it within Bounds; otherwise it will overspread the whole Spot, and destroy whatever Plants grow near it.

EPIPHYLOSPERMIOUS PLANTS [of *ἐπὶ* upon, *φυλλόν* a Leaf, and *σπέρμα*, Gr. Seed] such Plants as bear their Seeds on the Back of their Leaves; the same as *Capillaries*.

EQUINOCTIAL, EQUINOCTIAL, [of *ἴσος* Equal, and *Νύξ*, Lat. Night] a great and immoveable Circle of the Sphere, under which the Equator moves in its Diurnal Motion.

The Equinoctial, or Equinoctial-Line, is ordinarily confounded with the Equator: But there is a Difference; the Equator being moveable, and the Equinoctial immoveable; and the Equator drawn about the Convex Surface of the Sphere; but the Equinoctial, on the Concave Surface of the *Magnus Orbis*.

The Equinoctial is conceiv'd, by supposing a Semi diameter of the Sphere, produc'd through a Point of the Equator, and there describing a Circle on the immoveable Surface of the *Primum Mobile*, by the Rotation of the Sphere about its Axis.

Whenever the Sun comes to this Circle, in his Progress through the Ecliptick, it makes Equal Day and Night all around the Globe; as then arising due East, and setting due West, which he never does at any other Times of the Year.

The People who live under this Circle have their Days and Nights constantly Equal; and the Sun is in their Zenith at Noon, and casts no Shadow.

EQUINOXES, are the Times when the Sun enters into the Equinoctial Points, which are the two Points where the Equator and Ecliptick intersect each other; the one being in the first Point of Aries, call'd the Vernal Equinox; and the other in the first Point of Libra, call'd the Autumnal Equinox.

So the Equinoxes happen when the Sun is in the Equinoctial Circle, when, of Consequence, the Days are equal to the Nights throughout the World; which is the Case twice a Year, viz. about the 10th of March, and the 12th of September; the first of which is the Vernal, and the second the Autumnal Equinox.

EQUISETUM, [of *ἔκκος* an Horse, and *ἑτα* a Bristle, because the Leaves and Branches represent the Bristles or Hair of a Horse's Main or Tail. It is by the Greeks call'd *ἵππος*, of *ἵππος* an Horse, and *ἑτα* a Tail; and *Hippofeta*, of *ἵππος* and *ἑτα*] Horse-Tail.

There are several Species of this Plant, which are found in England, on the Sides of Ditches,

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or in shady Woods: but as they are Plants which are never cultivated in Gardens, so I shall pass them over in this Place.

ERANTHEMUM; vide *Adonis*.

ERICA [*Ereca*, of *ἐρεκα* or *εἰκα*, Gr. to break, because this Plant is said to have the Virtue of Breaking the Stone in the Bladder.] Heath.

The Characters are;

It is a Shrub of low Stature: The Leaves are small, and abide green all the Year: The Flower consists of one Leaf, is naked, and for the most part shap'd like a Pitcher: The Ovary (which is produc'd in the Bottom of the Flower) becomes a roundish Fruit, which is divided into four Cells, in which are contain'd many small Seeds.

The Species are;

1. *ERICA*; *vulgaris*, *glabra*. C. B. Common smooth Heath.
2. *ERICA*; *vulgaris*, *hirsuta*. C. B. Common rough-leav'd Heath.
3. *ERICA*; *tenuifolia*. Ger. Fine narrow-leav'd Heath.
4. *ERICA*; *vulgaris*, *flore albo*. C. B. Common Heath, with a white Flower.
5. *ERICA*; *Brabantica*, *folio Coridis*, *hirsuta* *quaterno*. J. B. Low-Dutch Heath.
6. *ERICA*; *foliis Coriis multiflora*. J. B. Fir-leav'd Heath, with many Flowers.
7. *ERICA*; *Cantabrica*, *flore maximo*, *foliis Myrti subtus incanis*. Tourn. Hoary Myrtle-leav'd Heath, with a large Flower.

These Plants grow wild upon barren uncultivated Places, in divers Parts of England: but notwithstanding their Commonness, yet they deserve a Place in small Quarters of humble Flowering Shrubs, where, by the Beauty and long Continuance of their Flowers, together with the Diversity of their Leaves, they afford a very agreeable Prospect.

These are seldom propagated in Gardens, and so not to be had from the Nurseries; but may be taken up, with a Ball of Earth to their Roots, from the natural Places of their Growth, either in Spring or Autumn, and may be transplanted into the Garden. The Soil where they are planted should not be dung'd; nor should you bestow any other Culture on them, than clearing them from Weeds; for the less the Ground is dug, the better these will thrive: and they commonly shoot their Roots near the Surface, which, in digging, are subject to be hurt, whereby the Plant is often destroy'd: These may also be propagated by Seeds; but this being a tedious Method, the other is much preferable to it.

ERICA BACCIFERA; vide *Empetrum*.

ERIGERON; vide *Senecio*.

ERUCA, [is so call'd of *ἐρεκα*, to attract, or of *erudere* to gnaw out, because this Plant has a hot biting Savour.] Rocket.

The Characters are;

The Flower consists of four Leaves, which expand in Form of a Cross: The Pointal

becomes a Pod, which is divided into two Cells by an intermediate Partition, to which the Valves adhere on both Sides; these Cells are full of roundish Seeds: To which may be added, The whole Plant hath a peculiar fetid Smell.

The Species are;

1. *ERUCA*; *sylvestris*, *major*, *lutea*, *caule aspero*. C. B. Greater wild Rocket, with a rough Stalk, and yellow Flower.
2. *ERUCA*; *tenuifolia*, *perennis*, *flore luteo*. J. B. Narrow-leav'd perennial Rocket, with a yellow Flower.
3. *ERUCA*; *Bellidis folio*. Mor. Hist. Daizy-leav'd Rocket.
4. *ERUCA*; *tanacetifolia*. H. R. Par. Tansey-leav'd Rocket.
5. *ERUCA*; *major*, *fativa*, *annua*, *flore albo striato*. C. B. Great Garden Rocket, with a white strip'd Flower.
6. *ERUCA*; *fativa*, *foliis magis dissectis*. Hort. Edin. Garden Rocket, with deeply-cut Leaves.

The four first Sorts are Varieties which are preserv'd in curious Botanick Gardens, but are Plants of no great Beauty or Use: The first is very common upon dry Banks and old Walls in divers Parts of England.

The fifth Sort was formerly very much cultivated in Gardens as a Salad-Herb, but at present is very little us'd.

The sixth is a Variety of the fifth, from which it differs in having the Leaves deeply cut or jagg'd.

These may be all propagated by sowing their Seeds in the Spring on a Bed of light Earth, where they will soon come up; and being Plants of quick Growth, will be large enough for Use in a short Time: for if they are suffer'd to grow large, they become too strong to be eaten in Salads. Some of the Plants may be left for Seeds, which they will produce in great Plenty the same Summer.

ERUCAGO; [so call'd of *Eruca* a Rocket, because this Plant resembles the wild Rocket.] Corn-Rocket.

The Characters are;

The Flower consists of four Leaves, which expand in Form of a Cross: The Pointal becomes a four-corner'd Fruit, resembling a crested Club, which is for the most part divided into four Cells, in which are contain'd roundish Seeds which have a Beak.

We have but one Species of this Plant, which is,

ERUCAGO; *segetum*. Tourn. Corn-Rocket.

This Plant grows wild in the warm Parts of France and Spain, and is preserv'd, for the sake of Variety, in curious Botanick Gardens. It may be propagated in like manner as the Rocket; but being a Plant of no Beauty or Use, is hardly worth cultivating.

ERVUM, [of *ἐρεκα* to eat, and *βῆ*, Gr. an Ox, because this Herb is eaten by Oxen.] Jointed-podded bitter Vetch.

The Characters are;

It hath a papilionaceous Flower, out of whose Empalement arises the Pointal, which becomes a jointed

jointed Pod, undulated on both Sides, and in a manner knotted, which is full of roundish Seeds: To which may be added, The Leaves grow by Pairs on a Mid-rib.

The Species are;

1. *ERVUM; verum. Camer.* The true *Ervum* of *Camerarius*. This is also call'd *Orobis, filiquis articulatis*. And the Seeds of this are sometimes used in Medicine.

2. *ERVUM; semine minore. Tourn.* Small-seeded *Ervum*.

3. *ERVUM; semine obtuso triangulo. Tourn.* *Ervum* with an obtuse triangular Seed.

4. *ERVUM; Orientale, Alopecuroides, perenne, fructu longissimo. T. Cor.* Oriental perennial *Ervum*, with a very long Fruit.

These Plants are very common in the Fields in warmer Countries, but are preserv'd in curious Botanick Gardens, for Variety. They may be propagated in the same manner as Peas, but require a warm Soil, and an open Situation, otherwise they will not ripen their Seeds with us. In the hotter Countries they use them for food, but with us they are of little use.

ERYNGIUM, [*Ἐρύγγιον*, Gr. Goat's-beard, because the Heads of this Plant, before the Stalks and Leaves are grown, resemble the Beard of a Goat.] Sea-Holly, or *Eryngo*.

The Characters are;

The Leaves are produc'd alternately on the Branches: The Flowers consist of five Leaves, which are plac'd orbicularly, and are reflex'd back to the Centre of the Flower: The Empalement afterwards becomes a Fruit, compos'd of two Seeds, which are sometimes foliated, and sometimes plain: To which may be added, The Flowers are collected into a squamose Head, which is prickly.

The Species are;

1. *ERYNGIUM; maritimum. C. B.* Sea-Holly, or *Eryngo*.

2. *ERYNGIUM; vulgare. C. B.* Common *Eryngo*.

3. *ERYNGIUM; latifolium, planum. C. B.* Broad-leav'd plain *Eryngo*.

4. *ERYNGIUM; latifolium, planum, caule ex viridi pallescente, flore albo. C. B.* Broad-leav'd plain *Eryngo*, with a greenish-white Stalk, and a white Flower.

5. *ERYNGIUM; montanum, Amethystinum. C. B.* Purple Violet colour'd Mountain *Eryngo*.

6. *ERYNGIUM; Alpinum, Amethystinum, capitulo majore pallescente. Tourn.* Alpine *Eryngo*, with a large pale-colour'd Head.

7. *ERYNGIUM; Orientale, foliis trifidis. T. Cor.* Oriental *Eryngo*, with trifid Leaves.

The first of these Species grows in great Plenty on the Sandy and Gravelly Shores in divers Parts of *England*, the Roots of which are Candy'd; and sent to *London* for Medicinal Use, and is the true *Eryngo*.

The fifth and sixth Sorts are beautiful Plants in Gardens; tho' at present they are very uncommon in *England*, but do deserve a Place in the most curious Flower-Gardens.

The other Species are preserved in very fine Gardens of Plants, for the sake of Variety, but have no great Beauty in them.

These Plants may all be propagated by parting of their Roots, or sowing their Seeds: The first being the most expeditious Method, is chiefly us'd; this must be done in *February*, or the Beginning of *March*, before the Roots have shot out their Leaves. The Soil in which these delight most is Gravel, or Sand: but if it be very dry, they will require to be often water'd in Summer, especially the first Sort. The second Year after Planting they will produce Flowers, but it is very rare that they do it the first; therefore it is the best Way to let the Roots remain unremov'd for three or four Years, by which Method your Flowers will be stronger, and in greater Plenty. These Plants commonly produce good Seeds, if the Season is not over-wet, which is sometimes apt to rot their Heads before the Seeds are ripe.

If you would propagate these Plants by Seed, it should be sown soon after it is ripe; for if it be kept until Spring before it is sown, the Plants seldom arise until the succeeding Year. When they are come up they should be carefully weeded; and in very dry Weather they should be refresh'd with Water two or three times a Week, which will greatly promote their Growth: In this Place they should continue until the succeeding Spring, at which time they should be transplanted out to the Places where they are to remain; for they do not care to be often remov'd: The third Year after sowing they commonly produce their Flowers, and continue for many Years so to do, provided they are not disturb'd.

The first and second Sorts creep very far under-ground, by which they greatly increase: but their Roots are of little Use, for they seldom grow to any considerable Size in a Garden.

ERYSIMUM, [*Ἐρύσιμον*, of *ἔρως*, Gr. to draw out, because this Plant, by means of its Hot Quality, has the Virtue of drawing any Thing out of the Body in which it lies hid.] Hedge-Mustard.

The Characters are;

The Flower consists of four Leaves, which expand in Form of a Cross: The Pointal becomes a long slender bristly Pod, which is divided into two Cells by an intermediate Partition, in which are contain'd many round Seeds.

The Species are;

1. *ERYSIMUM; vulgare. C. B.* Common-Hedge-Mustard.

2. *ERYSIMUM; latifolium, majus, glabrum. C. B.* Great broad-leav'd smooth Hedge-Mustard.

3. *ERYSIMUM; polyceratium, vel corniculatum. C. B.* Hedge-Mustard, with many crooked Pods.

4. *ERYSIMUM; angustifolium, majus. C. B.* Great narrow-leav'd Hedge-Mustard.

5. *ERYSIMUM; Sophia, dictum. Raii. Syn. Ed. 3.* Flix-weed.

There are several other Varieties of this Plant, which are preserv'd in Botanick Gardens: but as they are Plants of little Use or Beauty, so they are seldom propagated in any other Garden.

The

The first, second, and fifth Sorts are very common upon dry Banks in divers Parts of *England*: but the third and fourth Sorts are Natives of a warmer Country.

These may all be propagated by sowing their Seeds soon after they are ripe, which will come up in a short Time, and will stand Abroad and endure the Winter's Cold very well; and early in the *Spring* they will shoot up to Flower, and produce ripe Seeds in *June* or *July*: but if they are sown in the *Spring*, the Seeds seldom come up so well; nor do the Plants arrive at half the Strength of those sown in *Autumn*; for when the Heat comes on, they soon run up to Flower, and thereby produce not half the Quantity of Seeds.

The first and fifth Sorts are us'd in Medicine; but particularly the fifth, the Seed of which is by many People said to be an extraordinary Medicine for the Stone and Gravel.

ESCHYNOMENOUS, ÆSCHYNOMENOUS PLANTS; [*ἄσχυνομενος* of *ἀσχυνομενός* Gr. to be ashamed;] the Sensitive Plants, which when one comes near them, or touches them, will shrink in, or let their Leaves fall down.

ESCULENT PLANTS, [of *Esculentus*, Lat. *Eatable*] such Plants, or the Roots of them, that may be eaten, as *Beets*, *Carrots*, *Jerusalem Artichokes*, *Leeks*, *Onions*, *Parasprups*, *Potatoes*, *Radishes*, *Horse-radish*, *Scorzonera*, &c.

ESPALIERS,

Are either Rows of Tree planted about a whole Garden or Plantation, or in Hedges, so as to inclose Quarters or separate Parts of a Garden, which are train'd up flat in a close Hedge, for the Defence of tender Plants against the Violence and Injury of Wind and Weather. See *Hedges*.

The most-commonly receiv'd Notion of *Espaliers*, are Hedges of Fruit-Trees which are train'd up regularly to a Lattice of Woodwork, form'd either of *Alb* Poles, or square long Timbers cut out of *Fir*, &c. and it is of this Sort of *Espalier* that I shall treat in this Place.

Espaliers of Fruit Trees are commonly planted to surround the Quarters of a Kitchen-Garden, for which Purpose they are of admirable Use and Beauty: for by laying out the Walks of this Garden regularly, which are bounded on each Side by these Hedges, when they are handsomely manag'd, they have a wonderful Effect in sheltering the Kitchen-Plants in the Quarters, and also screening them from the Sight of Persons in the Walks: so that a Kitchen-Garden well laid out in this manner, and regularly manag'd, will be equal to the finest *Parterre* for Beauty.

The Trees chiefly planted for *Espaliers*, are *Apples*, *Pears*, and some *Plums*; but the two former are mostly us'd: some plant *Espaliers* of *Apples* grafted upon *Paradise*-Stocks; but these being of a short Duration, are not so proper for this Purpose; therefore I should rather advise the having them upon *Crae-*

Stocks, or (if in smaller Gardens, where the Trees cannot be allow'd to grow so high) upon *Codlin* Stocks, which will cause them to bear sooner, and prevent their growing too luxurious.

In chusing the Trees for an *Espalier*, endeavour, as near as possible, to plant the several Sorts which are nearly of the same Growth in one Line, that the *Espalier* may be the more regular, and of an equal Height, which greatly adds to their Beauty; for if you plant Trees which shoot very unequally in the same Line, it will be impossible to make the *Espalier* regular: besides, the Distance the Trees are to be planted must be directed hereby; for some Trees, viz. those of a large Growth, should be planted eighteen or twenty Feet asunder, whereas those of smaller Growth need not be above fourteen or sixteen Feet Distance from each other.

The Width of the Walks between these *Espaliers* should (in a large Garden) be fourteen or sixteen Feet at least; and if they are design'd to be carry'd up pretty high, the Distance should be greater, that each Side may receive the Advantage of the Sun and Air; which is absolutely necessary, if you would have the Fruit well-tasted. And if your Ground is so situated, that you are at full liberty which Way to make the *Espaliers*, I should advise the placing the Lines from the East a little inclining to the South, and toward the West, a little inclining to the North, that the Sun may shine between the Rows in the Morning and Evening when it is low; for in the Middle of the Day, when the Sun is advanced far above the Horizon, it will shine over the Tops of the *Espaliers*, and reach the Surface of the Earth about their Roots; which is a Matter of more Consequence than many People are aware of.

The Sorts of *Apples* proper for *Espaliers*, are the *Golden Pippen*, *Nonpareil*, *Rennette Grise*, *Aromatick Pippen*, *Holland Pippen*, *French Pippen*, *Wheeler's Russet*, *Pile's Russet*, with several others. The Season for Planting, and the Method of Pruning and Training these Trees, you'll see under the Articles of *Apples*, and *Pruning*.

The Sorts of *Pears* proper for an *Espalier*, are *Summer* and *Autumn* Fruits; for *Winter Pears* seldom succeed well in an *Espalier*. These Trees, if design'd for a strong moist Soil, should be upon *Quince* Stocks; but if for a dry Soil, upon *Free*-Stocks. Their Distance of Planting must also be regulated by the Growth of the Trees, which are more unequal in *Pears* than *Apples*, and should therefore be more carefully examin'd before they are planted. As for those *Pears* upon *Free*-Stocks, the Distance should never be less than sixteen Feet for moderate growing Trees; but for vigorous Shooters, twenty Feet are little enough, especially if the Soil be strong, in which Case they should be planted twenty-four Feet asunder. The particular Sorts of *Pears* I would recommend for an *Espalier*, are the *Fargonelle*, *Blanquett*, *Poir sans Peau*, *Summer Boncretien*, *Hamden's Burgamot*, *Poir du Prince*,

du Prince, Poir sans Peppin, Beurre du Roy, St. Michael, Le Marquis, Monsieur John, Cressane, with many others of less Note. As to the Method of Planting, see the Article *Pear*; and for Pruning and Managing, see *Pruning*.

I shall now give Directions for Making the *Espalier*, to which the Trees are to be train'd: But this I would not have done until the third Year after the Trees are planted; for while they are young, it will be sufficient to drive a few short Stakes into the Ground on each Side of the Trees, to which the Branches should be fasten'd in an horizontal Position, as they are produc'd; which Stakes may be plac'd nearer, or at a farther Distance, according as the Shoots produc'd may require, and will be sufficient for the three first Years; for should you frame the *Espalier* the first Year the Trees are planted, the Poles would rot before the *Espalier* is cover'd. The cheapest Method to make these *Espaliers* is with *Ash-Poles*, of which you should have two Sorts; one of the largest Size, which contains thirteen Poles in a Bundle, and the other Size those of half a hundred: The first or largest Size Poles should be cut about seven Feet and a half long; these are intended for Upright Stakes, and must be sharpen'd at the largest End, that they may with more Ease be driven into the Ground; these should be plac'd at a Foot Distance from each other in a direct Line, and of an equal Height, about six Feet above-ground; then you should nail a Row of stait slender Poles along upon the Tops of the upright Stakes, which will keep them exactly even, and continue to cross the Stakes with the smaller Poles, and the Tops which were cut off from the larger ones, at about nine Inches Distance, Row from Row, from the Top to the Bottom of the Stakes. These Rows of Poles should be fasten'd with Wire, and the largest End of the Poles should be nail'd to the upright Stakes, which will secure the *Espalier* almost as long as the Poles will endure: whereas if your Fastening is not strong, the Poles will be continually displac'd with every strong Wind.

When your *Espalier* is thus fram'd, you must fasten the Branches of the Trees thereto, either with small Osier Twigs, or some such Binding, observing to train them in an horizontal Position, and at equal Distances; being careful not to cross any of the Branches, nor to lay them in too thick: The Distance I would allow for the Branches of *Pears* and *Apples*, should be proportion'd according to the Size of their Fruit; such of them whose Fruit is large, as the *Summer Boncretien, Monsieur John*, and *Buerre du Roy Pears*, and the *Rennet Grise, H. land Pippen, French Pippen*, and other large *Apples*, should have their Branches six or eight Inches Distance at least; and to those of lesser Growth, four or five Inches will be sufficient: But for farther Directions, I shall refer to the Articles of the several Fruits, as also that of *Pruning*, where the Particulars will be sufficiently explain'd.

But besides this Sort of *Espalier* made with *Ash-Poles*, there is another Sort that is by

many People preferr'd, which is fram'd with square Timbers cut to any Size, according to the Strength thereof, or the Expence the Owner is willing to go to; these, tho' they appear more tightly, when well fix'd and painted, yet are not of longer Duration than one of the former, provided it is well made, and the Poles are strong which are set upright: nor do they answer the Purpose better, tho' they are vastly more expensive; for the greatest Beauty consists in the disposing the Branches of the Tree, which, especially in *Summer*, when the Leaves are on, will intirely hide from the Sight the Frame of the *Espalier*: Therefore all Expence in erecting these is needless, farther than making Provision to secure the Branches of the Trees in a regular Order.

Fruit-Trees thus planted, and well manag'd, are much preferable to those train'd up in any other Figure, upon several Accounts; as 1st, these take up very little Room in a Garden, so as to be hurtful to the Plants which grow in the Quarters; and 3^{dly}, the Fruit upon these are better-tasted than those which grow upon Dwarfs, the Sun and Air having freer Access to every Part of the Tree, whereby the Dampness arising from the Ground is sooner dissipated; which is of singular Advantage to Fruit-Trees, (as hath already been shewn.)

EVERGREEN-THORN; *vide* *Pyra-cantha*.

EVERLASTING PEA; *vide* *Lathyrus*.

EUONYMUS, [*Εὐώνυμος*, of *eu* good, and *onyma*, a Name, so call'd by way of Antiphrasis, because it is hurtful to Animals.] The Spindle-Tree, or Prickwood.

The Characters are;

It has four reddish Lines running along the Branches, which make them appear in some measure quadrangular: The Flowers, for the most part, consist of four Leaves, which are succeeded by quadrangular Fruit, containing four red Seeds in each.

The Species are;

1. EUONYMUS; *vulgaris, granis rubentibus*. C. B. The Common Spindle-Tree.

2. EUONYMUS; *latifolius*. C. B. Broad-leav'd Spindle-Tree.

3. EUONYMUS; *Africanus, Lycii crassioribus foliis; sempervirens, capsula triloculari, asperâ rubente*. Boerb. Ind. Ever-green African Spindle-Tree, commonly call'd African Barberry.

4. EUONYMO *adfinis; Æthiopica, sempervirens, fructu globofo, scabro, foliis scalicis, rigidis ferratis*. H. L. Ever-green Ethiopian Spindle-Tree, with a globular Fruit, and stiff serrated Willow-Leaves.

The first of these Species is very common in Hedges in divers Parts of England, where it seldom rises to any considerable Stature: but if planted amongst other Trees in Wilderness Quarters, may be train'd up so as to become a large handsome Tree; and in the Autumn-season when the Fruit is ripe, doth make a very handsome Shew. The Wood of this Tree is us'd by the Instrument-makers, for Tooothing of

Organs and Virginal-Keys, Tooth-pickers, Spindles, and to make Scares, &c. The Broad-leav'd Sort, tho' very common in most Parts of *Europe*, yet is rarely to be found in *England*, except in curious Collections of Trees and Shrubs: These two Plants are very hardy, in respect to Cold, and may be propagated either by sowing the Seeds, or laying down the Branches: but the first being a tedious Method, is seldom practis'd; for the Seeds remain in the Ground until the second Year before the Plants come up, and afterwards make but little Progress during the three or four first Years, whereas those rais'd by Layers will make handsome Trees in three or four Years Time.

The other two Sorts being Natives of a warm Country, will not endure the Cold of our Climate in the open Air, and must therefore be preserv'd in a good Green-house in Winter. These may be propagated by planting Cuttings any time from *May* to *September*, which should be set into Pots fill'd with fresh light Earth, and plung'd into a moderate Hot-bed, and carefully water'd and shaded until they have taken Root; after which, they may be transplanted each into a separate Pot, and expos'd to the open Air till *September*, when they should be remov'd into the Green-house, where, during the Winter-season, they must have as much free open Air as the Weather will admit of, as also frequent, but gentle Waterings: in other respects they may be manag'd as *Orange Trees*, observing to shift the Plants into fresh Earth every Year.

The third Sort grows to be a Shrub of five or six Feet in Height, and will produce great Quantities of Fruit, which ripen in Winter, and make a very good Appearance in the Green-house at that Season. This is the tenderest Plant of them all.

The fourth Sort arises with us to the Height of ten or twelve Feet, and may be train'd up to a regular Head; and when grown to be large, will annually produce Flowers and Fruit; which altho' they have no great Beauty, yet the Tree, for Variety, deserves a Place in every good Collection of Plants. This is pretty hardy, and only requires to be shelter'd from extreme Frosts in *Winter*, and therefore should be early expos'd to the open Air in *Spring*, and suffered to remain abroad in *Autumn*.

EUPATORIUM, [*Eὐπατοριον*, of King *Eupato*, who first brought this Plant into Use; or of *Ἐπατιρις*, of *Ἑλκας*, Gr. the *Liver*, because this Plant is good for Diseases of the Liver; or of *Εὐπατορ*, i. e. good Father, or, a Son beloved by his Father, which Name many of the Kings of *Egypt* have born.] Hemp-Agrimony.

The Characters are;

It hath a perennial fibrose Root: The Leaves are plac'd opposite upon the Stalks: The Cup of the Flower is long, taper, and scaly: The Flowers are collected into an Umbel upon the Tops of the Stalks, which consist of many long bifid Threads.

The Species are;

1. **EUPATORIUM**; *Cannabinum*. C. B. Common Hemp-Agrimony.

2. **EUPATORIUM**; *urticae foliis, Canadense*, flore albo. H. L. Canada Hemp-Agrimony, with Nettle-Leaves, and a white Flower.

3. **EUPATORIUM**; *Novae Angliae, utricae foliis, floribus purpurascens, maculato caule*. H. L. New England Hemp-Agrimony, with Nettle-Leaves, purplish Flowers, and spotted Stalks.

4. **EUPATORIUM**; *folio oblongo, rugoso, caule purpurascens*. Tourn. Canada Hemp-Agrimony, with a long rough Leaf, and purplish Stalk.

5. **EUPATORIUM**; *Novae Angliae, Betonicae foliis villosis, flore albo*. Par. Bat. New England Hemp-Agrimony, with Betony Leaves, and a white Flower.

6. **EUPATORIUM**; *Americanum, scandens, hastato magis acuminato folio*. Vaill. Climbing American Hemp-Agrimony, with a Spear-like sharp-pointed Leaf.

7. **EUPATORIUM**; *Americanum, foliis rotundioribus absque pediculis*. Vaill. American Hemp-Agrimony, with round Leaves without Foot-stalks.

The first of these Plants is found wild by Ditches and River Sides in most Parts of *England*, and is the only Species of this Genus which is a Native in *Europe*: but *America* abounds with a vast Number of Species, many of which are annually brought over, and preserv'd in curious Botanick Gardens, tho' the first Sort is only at present used in Medicine.

These Plants are all hardy enough to endure the Cold of our Winters in the open Air, provided they are planted in a dry Soil, and may be propagated by parting their Roots in *March*, or *October*: but if you do this in the *Spring*, you must observe to water and shade the Plants until they have taken Root, if the Weather should prove dry, and those that are transplanted in *Autumn* should be protected from severe Frosts in *Winter*, which would be apt to destroy them before they have got fast Rooting in the Ground.

These Plants may also be propagated by sowing their Seeds, which should be done early in the *Spring*, upon a Bed of light Earth, observing to water them in dry Weather: but they seldom come up until the second Year; and it is not till the third Year that they produce Flowers: therefore, if the Plants are not too thick in the Seed-bed, they may be permitted to remain there till after their Flowers are past; and in *October* remove them to the Places where they are design'd to grow. These Plants have little Beauty in them, and therefore are seldom preserv'd, unless in Botanick Gardens for Variety.

EUPHORBIIUM, [*Εὐφορβιον*, of *εὖ* well, and *φορβιον*, Gr. to feed, so call'd anciently from *Euphorbus*, the Brother of *Antonius Musa*, Physician to King *Juba*, who cured *Augustus Caesar* with this Plant.]

The Characters are;

It hath Flowers and Fruit like the Spurge,
and

and is also full of a hot, sharp, milky Juice : The Plants are angular, and shap'd somewhat like the Cereus or Torch-Thistle ; it is commonly beset with Spines, and, for the most part, hath no Leaves.

The Species are ;

1. EUPHORBIIUM ; *verum, antiquorum. Raii Hist.* The true Euphorbium of the Antients.
2. EUPHORBIIUM ; *tetragonum, & pentagonum, spinosum, Canarinum. Boerb. Ind.* Canary Euphorbium, with four or five Angles, and beset with Spines.
3. EUPHORBIIUM ; *trigonum, & tetragonum, spinosum, ramis compressis. D'Isnard.*
4. EUPHORBIIUM ; *Cerei effigie, caulibus crassioribus, spinis validioribus armatum. Breyn. Prod.* Thick-stalk'd Cereus, like Euphorbium, arm'd with strong Spines.
5. EUPHORBIIUM ; *Cerei effigie, caulibus gracilioribus. Boerb. Ind.* Slender-stalk'd Cereus, shap'd like Euphorbium.
6. EUPHORBIIUM ; *Afrum, caule squamoso tuberoso. Boerb. Ind.* African Euphorbium, with scaly Stalks and a tuberoso Root.
7. EUPHORBIIUM ; *Afrum, caule squamoso tuberoso, minus. Boerb. Ind.* Lesser African Euphorbium, with scaly Stalks, and a tuberoso Root.
8. EUPHORBIIUM ; *Afrum, caule crasso squamoso, ramis in capitis Medusæ speciem cincto. Boerb. Ind.* African Euphorbium, with thick scaly Stalks, and branching at the Top like Medusa's Head, commonly call'd the Snake-Euphorbium.
9. EUPHORBIIUM ; *Afrum, facie fructus pini. Boerb. Ind.* African Euphorbium, with the Face of the Pine Fruit, commonly call'd Little Medusa's Head.
10. EUPHORBIIUM ; *angulosum, foliis nerii latioribus. Boerb. Ind.* Angular Euphorbium, with broad Oleander Leaves.
11. EUPHORBIIUM ; *heptagonum, spinis longissimis, in apice frugiferis. Boerb. Ind.* Euphorbium with seven Angles, and long Spines bearing Fruit upon the Tops.
12. EUPHORBIIUM ; *quod Anteuphorbium. Dod.* The Anti-Euphorbium ; *vulgò.*

All these Plants being Natives of warm Countries, must with great Care be preserved in Stoves during the Winter ; and being replete with a milky Juice, they require very little Moisture : nor should they be planted in a rich Soil, which is very hurtful to them. They are all (so far as we are acquainted with their Places of Growth) Inhabitants of Rocky hard barren Soils : therefore the most proper Earth for them, is one half Sea-sand, one quarter light fresh Earth, and a quarter-part Lime-Rubbish : This should be mix'd up well together two or three Months before it is used, observing to turn it over three or four times, that the several Parts may be the better united ; and afterwards, it will be proper to skreen it, in order to take out the large Stones.

These Plants are propagated by planting Cuttings : The best Season for this is in June or July : The Cuttings should be taken off from the old Plants a Week or Fortnight before

they are planted ; during which Time, they should lie in a dry shady Place, that the Part which adher'd to the old Plant may be dry'd and harden'd, otherwise the Cuttings will rot : Then plant them into small Half-penny Pots fill'd with the above-mention'd Earth, giving them a little Water to settle the Earth to them, and let the Pots be set for a Day or two in a Place where they may have only the Morning-Sun : after this, plunge them into a moderate Hot-bed of Tanners Bark, observing, in the great Heat of the Day, to shade the Glasses with Mats, as also, once a Week, to give 'em a gentle Refreshing with Water : but you must be very careful, not to give them too much, which will immediately rot them, especially before they have taken Root.

In about five or six Weeks Time the Cuttings will have shot out some Roots, which you may easily perceive, by carefully observing the Tops of the Cuttings, which will then begin to advance in Height, and appear of a lighter Green Colour than at the Bottoms of 'em ; at which Time you must begin to give them Air by degrees, raising the Glasses with Bricks in the Middle of the Day, and so increasing the Quantity of Air daily, until at last you remove them quite out of the Bark-bed, which should be done towards the Latter-end of August, when you should place them into the Stove, observing not to expose 'em too much to the Air ; also being very careful not to let 'em have too much Moisture, which is very destructive to these Plants.

During the Winter-season they must be plac'd in a warm Part of the Stove, which should always be kept to the Temperate Heat, as mark'd on Mr. Fowler's Botanical Thermometers, which I find does better agree with all the Sorts of this Plant, than a greater Degree of Heat. The first, third, and eleventh Sorts are the tenderest, and should therefore be plac'd nearer to the Fire-place in the Stove than the other Sorts, especially the eleventh, which should be plac'd to receive as much Light as possible, and must not have one Drop of Water from October till March ; for it is very subject to rot, upon receiving the least Moisture at that Season ; but the other Sorts will require a little Water in a Fortnight or three Weeks Time, especially if they stand in a Stove where the Heat is regularly kept up ; this will preserve the Plants from shrinking, which they are sometimes subject to, when kept too dry.

These Plants should not be expos'd to the open Air in Summer, but always allowed to continue in the Stove, observing to place them as near the Windows as conveniently you can, that they may enjoy as much free Air as possible : when the Weather will permit, the Glasses should be open'd ; but they should never be expos'd in the Night, or to hard Rains.

July is the best Season for shifting these Plants, when you should be provided with a Quantity of the before-mention'd Earth ; and after having shaken them out of the Pots they before grew in, you should with your Hands take off as much of the Earth round the Roots

Roots of the Plants as possible, without breaking them; then having put a few Stones in the bottom of the Pots to drain off the Moisture, you should fill the Pots about half full of the new Earth, and set the Plants in the Middle of the Pots, filling up the Vacancies with the Earth, and pressing it down gently with your Hands, to settle the Earth close to the Roots of the Plants: afterwards give them a little Water, and then remove them into the Stove again; observing, if the Weather should be very hot and dry, to screen the Glasses of the Stove in the Middle of the Day, until the Plants are well rooted again.

N. B. You must never put those Plants into large Pots; for as they are most of them Inhabitants of Rocky Places, so they should be pretty much confin'd in their Roots; for if the Pots are too big, the Plants, if they don't rot, will make but small Progress therein.

The first of these Sorts is by many learned Authors suppos'd to be the true *Euphorbium* of the Ancients; though I believe, what we now use, is taken from more Species of Plants than one. And I am credibly inform'd by a very curious Gentleman who liv'd many Years in the *Canaries*, That the greatest Part of the *Euphorbium* us'd in *England* came from thence, and is produc'd from the second Sort. And by carefully looking over some of this Drug in a Shop, I found several Spines amongst it, which exactly agreed with those of that Plant.

The twelfth Sort is by some suppos'd to be an Antidote to the *Euphorbium*; but with how much Justice I can't say: however, as it has been by most Authors ranged amongst those Plants, I thought proper to continue it there; tho' indeed it has little Affinity with them in its outward Appearance, nor is its Juice milky or hot: but as it hath not as yet produc'd any Flowers in *Europe*, so we can't tell how to dispose it under a particular Genus which may be more fit for it than this to which it is at present fix'd.

This Plant requires a less Degree of Heat in Winter, and to be oftener water'd than any of the other Kinds, and is much easier increas'd, whereby it is more common than the others, and is less esteem'd, as being very difficult to reduce to any regular Figure.

The eleventh Sort is one of the most beautiful, and by far the most rare of any of the Species, and is only to be found at present in two or three very curious Gardens in *England*. This is very difficult to preserve, as also to increase; for the Cuttings, if they are not well dry'd before they are planted, will certainly rot.

The first is also a very beautiful Plant, and is pretty rare: but as it is easily propagated, so it will soon become more common in *England*; as will also the third Sort, which is at present less common than many of the others.

But the second is a Plant of a wonderful Structure; the Branches coming out from every Side of the main Stem, and turning upwards, do very much resemble the Branch'd Candlesticks in Churches: This is pretty com-

mon in *England*, and has been an old Inhabitant of the *English* Gardens.

EXCORTICATION, [*Excortication*, Lat.] a Pulling or Peeling off the outward Bark of Trees.

EXOTICKS, [*Exotica*, Lat.] *Exotick* Plants, are such as are Natives of Foreign Countries.

F A

FABA; [of *φαγῆν*, Gr. to eat, because the Seed of it is very much eaten.] The Bean.

The Characters are;

It hath a papilionaceous Flower, which is succeeded by a long Pod, which is fill'd with large flat Kidney-shap'd Seeds: The Stalks are firm, and hollow; the Leaves grow by Pairs, and are fasten'd to a Mid-rib.

The Species are;

1. **FABA**; *major, recentiorum*. *Lob. Icon.* The common Garden-Bean.

2. **FABA**; *minor, seu Equina*. *C. B.* The Horse-Bean.

There are several Varieties of these two Sorts of Beans, which differ either in Colour or Size; but as these are only seminal Variations, so I think it needless to mention them here, since every one who has cultivated them, knows that they every Year vary in their Colour and Size. The particular Direction for their Culture, you'll see under the Article of *Bean*.

FABA ÆGYPTIA; *vide Arum Ægyptiacum*.

FABA CRASSA; *vide Anacampteros*.

FABAGO, Bean-Caper, [is so call'd of *Fabis*, Lat. Beans, because its Leaves resemble those of Beans; and *Capers*, of *Capparis*] the Fruit of this Plant being like that of the Caper.

The Characters are;

The Leaves are produc'd by Pairs upon the same Foot-stalk, which Foot-stalks grow opposite at the Joints of the Stalks: The Cup of the Flower consists of five Leaves: The Flowers also consist of five Leaves, which expand in Form of a Rose, and have many Stamina or Threads that surround the Style in the Centre of the Cup; which Style becomes a cylindrical Fruit, and is, for the most part, five-corner'd, divided into five Cells by intermediate Partitions, each of which contains many flat Seeds.

The Species are;

1. **FABAGO** *Belgarum*; *five Peplus Parisiensium*. *Lugd.* Bean-Caper; *vulg.*

2. **FABAGO**; *Africana, arborescens, flore sulphureo, fructu rotundo*. *Com. Rar.* African Tree Bean-Caper, with a Sulphur-colour'd Flower, and a round Fruit.

3. **FABAGO**

3. *FABAGO*; *Africana, frutescens, folio latiori, fructu tetragono*. African shrubby Bean-Caper, with broader Leaves, and a four-corner'd Fruit.

The first of these Plants is pretty hardy, and will endure the Cold of our Winters in the open Air, provided it be planted in a dry Soil and a warm Situation: This is propagated by sowing the Seeds in the Spring, either on a warm Border or a moderate Hot-bed; and when the Plants are come up, they may be planted into Pots fill'd with light sandy Earth, or in warm Borders under Walls or Hedges of the like Soil, for they do not care for a rich dung'd Soil, nor a strong or moist Earth. The Distance these Plants should be planted at, must not be less than two Feet each Way, for they grow to be very large, and from a strong Head: The Branches die away every Winter to the Head, and shoot again the succeeding Spring, and will produce great Plenty of Flowers and Fruits annually, and their Roots will abide many Years, but are very apt to die if remov'd after they are grown large.

This Plant is of no use at present in *England*, but for the Variety of its Flowers deserves a Place in good Gardens.

The other two Sorts, being Natives of a warm Country, will not endure the Cold of our Climate abroad, but must be preserved in a Green-house: They may be propagated by sowing their Seeds upon a Hot-bed in the Spring: and when the Plants come up, they should be planted into Pots fill'd with fresh sandy Earth, and may be expos'd during the Summer with other Green-house Plants; but in Winter should be plac'd in an airy Part of the House, and must not be crowded with other Plants, which will cause them to mould and shed their Leaves; and many times destroy the whole Plant: They should also have frequent Refreshings with Water, but should not have too much at a time; for that very often destroys these Plants.

They may also be increas'd by planting Cuttings in any of the Summer Months into Pots of light Earth, which should be plung'd into a moderate Hot-bed, to facilitate their Rooting, observing to shade them from the Violence of the Sun, as also to give them Water frequently: When they are rooted, which will be in about two Months after planting, they may be transplanted into separate Pots fill'd with the same light Earth, and should be expos'd to the open Air by degrees, and afterwards may be treated as was before directed for those rais'd from Seeds.

These Plants are generally preserv'd in all curious Collections of Plants for Variety, but are of no Use with us at present.

FAGOPYRUM; [of *φαγω* to eat, and *πυρον* Bread-corn, because an edible Grain; or of *Fagus*, the *Beach-tree*, because it has triangular Seeds like those of the *Beech*.] Buck-Wheat.

The Characters are;

The Flowers are specious, growing in a Spike; or branch'd from the Wings of the Leaves: The Cup of the Flower is divided into five Parts, and

resemble the Petals of a Flower: The Seeds are black, and three-corner'd.

The Species are;

1. *FAGOPYRUM*; *vulgare, erectum*. *Tourn.* Common upright Buck-Wheat.

2. *FAGOPYRUM*; *vulgare, scandens*. *Tourn.* Common creeping Buck-Wheat.

The first of these Plants is cultivated in many Parts of *England*, and is a great Improvement to dry barren Lands. The best Season for sowing the Seed is in *May*: One Bushel will sow an Acre. The Ground should be plough'd and dress'd in the same manner as for *Barley*; and if the Soil is not very lean, it will yield a very great Increase, as fifty or sixty Bushels upon an Acre, and is excellent Food for Hogs, Poultry, &c. The Flour of it is very white, and makes a very good Sort of Pancake, if mix'd with a little Wheat-flour. The Straw is good Fodder for Cattle; and the Grain given to Horses amongst their Oats, will make them thrive; but it must be broken in a Mill, otherwise it is apt to pass through the Cattle whole.

It is commonly late in the Season before it is ripe, but it is in no great Danger of the Seeds falling, nor of suffering by Wet after it is mown: It must lie several Days to dry, that the Stalks (which are hard) may wither before it is hous'd.

Buck-Wheat is sometimes sown very thick, and suffer'd to grow until it is near flowering, and is then plough'd in, which makes a very good Lay for *Wheat* or *Rye*: But some People esteem it the better Way to feed it with Cattle, especially Milch-Cows, which they say, will cause them to give a great deal of Milk, and make both the Butter and Cheese very good. This will also afford Food for Cattle in the driest time, when all other Grass is burnt up.

The second Sort is found wild in divers Parts of *England*, but is seldom cultivated for Use.

FAGUS; [is so call'd of *φαγω*. Gr. to eat; because its triangular Nuts are edible, and afford good Nutriment: It is call'd in *Greek* *ἔλα*, of *ἔλας*, of *ἔλας*. Gr. sharp, because its Fruit is acuminate.] The *Beech-Tree*.

The Characters are;

It hath Leaves somewhat resembling those of the *Horn-beam*: The Male Flowers grow together in a round Bunch, and are produc'd at remote Distances from the Fruit on the same Tree: The Fruit consists of two triangular Nuts, which are inclos'd in a rough hairy Rind, divided into four Parts.

The Species are;

1. *FAGUS*. *Dod.* The *Beach-Tree*.

2. *FAGUS*; *foliis ex luteo variegatis*. The *Yellow-strip'd Beech-Tree*.

3. *FAGUS*; *foliis ex albo variegatis*. The *White-strip'd Beech-Tree*.

There is but one Species of this Tree at present known; (except the two Varieties with strip'd Leaves, which are accidental) though the Planters would distinguish two or three Sorts; one of which they call the *Mountain-Beech*, and, as they say, affords a much whiter

K k k

Timber

Timber than the other which they call the *Wild Beech*: But as these have never been distinguish'd by the *Botanists*, nor can I perceive any real Difference amongst all the Trees of this Kind I have yet seen, so I rather think the Difference in the Colour of the Wood is occasion'd by the Places of their Growth; which is often observ'd to be the Case with most other Sorts of Timber.

This Tree is propagated by sowing the Mast; the Season for which is any time from *October* to *February*, only observing to secure the Seeds from Vermin when early sow'd; which if carefully done, the sooner they are sown the better, after they are fully ripe: A small Spot of Ground will be sufficient for raising a great Number of these Trees from Seed, but you must be very careful to keep them clear from Weeds; and if the Plants come up very thick, you should not fail to draw out the strongest of them the *Autumn* following, that those left may have Room to grow: So that if you husband a Seed-bed carefully, it will afford a three Years Draught of young Plants; which should be planted in a Nursery, and, if design'd for Timber-trees, at three Feet Distance Row from Row, and eighteen Inches asunder in the Rows.

But if they are design'd for Hedges, (to which the Tree is very well adapted) the Distance need not be so great, two Feet Row from Row, and one Foot in the Rows will be sufficient. In this Nursery they may remain two or three Years, observing to clear them from Weeds, as also to dig up the Ground between the Roots, at least once a Year, that their tender Roots may the better extend themselves each Way; but be careful not to cut or bruise their Roots, which is injurious to all young Trees, and never dig the Ground in *Summer*, when the Earth is hot and dry, which by letting in the Rays of the Sun to the Roots, is often the Destruction of young Trees.

This Tree will grow to a considerable Stature, though the Soil be stony and barren, as also upon the Declivities of Hills, and chalky Mountains, where they will resist the Winds better than most other Trees; but then the Nurseries for the young Plants ought to be upon the same Soil; for if they are rais'd in a good Soil and a warm Exposure, and afterwards transplanted into a bleak, barren Situation, they seldom thrive, which holds true in most other Trees, therefore I would advise the Nursery to be made upon the same Soil where the Plantation is intended: But of this I shall say more under the Article of *Nursery*.

The Tree is very proper to form large Hedges to surround Plantations or large Wildernesse's Quarters, and may be kept in a regular Figure, if shear'd twice a Year, especially if they shoot strong; in which Case, if they are neglected but a Season or two, it will be difficult to reduce them again. The Shade of this Tree is very injurious to most Sorts of Plants which grow near it, but is generally believed to be very salubrious to human Bodies.

The Timber is of great Use to Turners for

making *Trenchers*, *Dishes*, *Trays*, *Buckets*; and likewise to the Joyner for *Stools*, *Bedsteads*, *Coffers*, &c. The Mast is very good to fat *Swine* and *Deer*; it also affords a sweet Oil, and hath in some Families supported Men with Bread.

The two Sorts with variegated Leaves, may be propagated by budding or grafting them upon the common *Beech*, observing not to plant them in a good Earth, which will cause the Buds or Cyons to shoot vigorously, whereby the Leaves will become plain, which often happens to most variegated Plants.

FARINA FOECUNDANS, is the impregnating Meal or Dust on the *Apices* of Flowers, which being convey'd into the *Uterus* or *Vasculum Seminale* of Plants, fecundates the Rudiments of the Seeds in the *Ovary*, which otherwise would decay and come to nothing. See *Generation of Plants*.

FEATHERFEW or **FEAVERFEW**; *vide* *Matricaria*.

FEBRUARY. This Month, if the Weather is mild and open, is as busy a Season as any of the Year, for a great Part of the Summer Productions depends upon the Care taken in this Month to sow or plant the Variety of Kitchen-Herbs, Roots, &c.

Work to be done in the Kitchen and Fruit-Garden this Month.

The Beginning of this Month, make Hot-beds for *Cucumbers*, *Melons*, early *Pease*, *Strawberries*, *Kidney-Beans*, &c. as also to sow some *Colliflower-Seeds*, to succeed those which were sown the *August* before: But these late Crops are only proper for moist Soils, in which they are often as good as those preserv'd through the *Winter*. Dig and trench such Quarters of your Kitchen-Garden as were not before done, and plant out your Plants of the *Large-sided* or *Sugar-loaf Cabbage*, which were sown the *August* before: Plant a second Crop of *Windfor-Beans*, and sow *Pease*, *Carrots*, *Onions*, *Leeks*, *Parsnips*, *Radishes*, *Spinage*, *Lettuce*, *Scorzonera*, *Skirrets*, *Salsafy*, *Parsley*, *Corn-Sallad*, *Asparagus*, with most other hardy Seeds.

Plant *Garlick*, *Shalots*, *Rocambole*, and *Onions* for Seed; or to draw up in *April* for *Scallions*.

If the Weather is mild towards the Middle or latter End of the Month, you must transplant your *Colliflower-Plants* out of the Beds where they were preserv'd through the *Winter*; and slip and plant *Artichokes*, if the Soil be dry, otherwise it will be better to defer this Work until the next Month.

Continue to make Hot-beds for *Asparagus* to come in the next Month, and be very careful of your *Cucumber* and *Melon* Plants at this Season, especially if the Weather be dark and cloudy, which is very often destructive to them, if great Care be not taken to preserve an equal Heat in the Beds, and Air given to them at all proper Opportunities.

Plant

Plant *Potatoes* and *Jerusalem-Artichokes*, if it was not done before, and sow small *Sallet Seeds* upon moderate Hot-beds, or in warm Borders under Walls.

You may now safely transplant *Fruit* or *Forest-Trees*, if the Weather be mild, and lay down the Branches of hardy *Trees* to take root.

Towards the latter End of the Month you must graft *Pears*, *Plums* and *Cherries*; set *Kernels*, *Nuts*, or *Stones of Fruit*; sow *Beach-Mast*, and other *Seeds of Forest-Trees*, and hardy *Flowering-Shrubs*.

Prune and train up such of your *Espalier Fruit-Trees* as were not before done, and prune *Apricocks*, *Plums*, *Pears*, &c. against the Walls; but let *Peach* and *Nectarines* be the last done, for their Branches are very subject to decay where they were cut, if it should prove bad Weather after it is done.

The Products of the Kitchen-Garden in February.

Beets, *Carrots*, *Parsnips*, *Leeks*, *Onions*, *Potatoes*, *Turnips*, *Cabbages*, *Savoys*, *Coleworts*, *Broccoli*, *Spinage*; and under Frames, several sorts of *Sallet-Herbs*; and upon the Hot-bed, *Asparagus*, now very good.

Fruits in prime, or yet lasting.

Apples: The *Rennet Grise*, *Aromatick Pippin*, *Golden Russet*, *Winter Pearmain*, *John Apple*, *Golden Pippin*, *Nonpareil*, *Holland Pippin*, *French Pippin*, *Kentish Pippin*, *Stone Pippin*, *Oaken Pin*, with some others of less Note.

Pears: *Winter Bon-cretien*, *Bugi Portail*, *Winter Russelett*, *Cadillac*, *Bezy du Chaumontelle*, *Citron d'Hyver*, *Ld. Cheyney's Green Pear*, *Winter-Bury*, with some others.

Work to be done in the Flower-Garden and Green-House this Month.

If the Weather be mild, you must clean the Surface of the Ground, on *Flower-Borders* and *Beds*, and transplant *Carnations* into the Pots they are to remain to flower in; as also such as are for *Borders*, if they were not planted out in the *Autumn*, should be now remov'd to the Places where they are to flower.

You may yet sow *Auricula's* and *Polyanthos Seeds*; though *January* is preferable to this Month.

About the Middle of this Month you should take the Surface of the Earth out of the Pots of *Auricula's*; and after picking off all decay'd Leaves from the Plants, you must fill up the Pots with very rich light Earth, which will cause them to flower strong: but you must carefully cover the Pots in the Night, if it happens to be hard Frosty Weather, after the Buds of the Flowers appear in the Center of the Plants; for otherwise they are subject to be destroy'd: so that many times there will not be above four or five Flowers upon a Stalk; whereas if they had been cover'd duly, there might be eighteen or twenty, or more.

You may now transplant *Canterbury Bells*, *French Honeysuckles*, *Daizies*, *Scarlet Lych-*

nis's, *Rose Campions*, *Fox-Gloves*, *Pinks*, *Sweet Williams*, *Perennial Catch-Flies*, *Campanula's*, *Tbrist*, with most other *Fibrose-rooted Plants* that do not flower too early in the Spring.

Make *Layers of Jasmines*, *Honeysuckles*, and other *Flowering Shrubs*.

Dig and prepare your Ground for *Nursery-beds* against the succeeding Month, when other Business will come on apace: so that if you do not get Things in Readiness this Month, you will be so much hurry'd in the next, that many Things must be neglected or left undone.

Break-up your *Gravel-Walks*, and turn 'em; but do not *Rake* 'em till next Month.

You may now plant *Box* to edge *Borders*: but it is a better Season for this Work in *September* or *October*, if the Ground be dry; tho' in wet Soils this Month is preferable.

The Weather being mild, and the Air soft, you must begin to give Air by degrees to the *Green-house Plants*: but do not open the *Windows* when the *Winds* are sharp and piercing, altho' the Sun may shine warm.

You should also pick off all decay'd Leaves from your Plants, and stir the Surface of the Earth in your Pots and Tubs, and add a little fresh Earth thereto, giving them a little Water to settle the Earth.

You should also at this Season add a little fresh *Tanners Bark* to the Hot-bed in the Stove, stirring up the old Bark, which by this Time, has lost a great part of its Heat, mixing the fresh amongst it, and plunge the Pots again into it; this will cause a fresh Fermentation, whereby the Heat will be renewed.

Toward the Latter-end of this Month you should make fresh Bark-beds for *Anana's*, which should be plung'd therein in *March*.

And make Hot-beds for *Tender Annuals*, and other *Exotick Seeds*, which require to be brought forward in the Spring.

Sow the *Kernels of Oranges* and *Lemons* in Pots, as soon as they come out of the Fruit, and set the Pots into a Hot-bed. *N. B.* The *Kernels of Rotten Fruit* are much preferable to any other.

Plants now Flowering in the Pleasure-Garden.

Single Anemonies, *Winter Aconite*, *Hellebores*, *Bears-foot*, *Crocus's*, *Vernal Cyclamens*, *Snowdrops Double and Single*, *Early White*, *Blue* and *Small Starry Hyacinth*, *Persian Iris*, *Hepatica's*, *Single Wall-Flower*, *Early Tulips*, *Polyanthus Narcissus*, *Daizies*, *Fennel-leaf'd Perennial Adonis*, *Spring Bastard-Navelwort*, *Laurustinus's*, *Mezereon's*, *Spurge Laurel*, *Spanish Travellers Joy*. And if the Weather be mild, towards the End of the Month, some *Almonds*, the *Cherry-Plum*, with some others.

Plants now Flowering in the Green-House.

Indian, *Spanish*, and *Ilex-leaf'd Jasmines*, *Geranium's*, *Ficoides's*, several Sorts of *Aloe's*, *Aleppi Cyclamens*, *Polygala Arborecens*, *Senecio folio retuso*, *Chrysanthemum's*, *Hermannia's*, with some others.

FENCES. In hotter Climates than *England*, where they have not Occasion for Walls to

to ripen their Fruit, their Gardens lie open, where they can have Water-Fences and Prospects; or else they bound their Gardens with Groves, in which are Fountains, Walks, &c. which are much more pleasing to the Sight than a dead Wall: but in colder Countries and in *England* we are oblig'd to have Walls to shelter and ripen our Fruit, altho' they take away much from the pleasant Prospect of the Garden.

Since therefore we are under a Necessity to have Walls to secure our Gardens from the Injury of Winds, as well as for the Convenience of Partitions or Inclosures, and also to ripen our Fruit, Brick-Walls are accounted the warmest and best for Fruit: And these Walls being built Pannel-wise, with Pillars at equal Distances, will save a great deal of Charge; in that the Walls may be built thinner, than if they were built plain without these Pannels; for then it would be necessary to build them thicker every-where: and besides, these Pannels make the Walls look the handsomer.

Stone-Walls are to be preferr'd to those of Brick, especially those of square-hewn Stones. Those that are made of rough Stones, though they are very dry and warm, yet, by reason of their Unevenness, are inconvenient to nail up Trees to, except Picces of Timber be laid in them, here and there, for that Purpose.

But in large Gardens it is better to have the Prospect open to the Pleasure-Garden, which should be either surrounded with Water, or a Fauff, so that from the Garden the adjacent Country may be view'd.

A Kitchen-Garden, if rightly contriv'd, will contain Walling enough to afford a Supply of such Fruits as require the Assistance of Walls for any Family; and this Garden being situated on one Side of the House, may be surrounded with Walls, which will skreen the Kitchen-herbs from the Sight of Persons in the Pleasure-Garden; and being lock'd up intire, the Fruit will be much better preserv'd than it can be in the publick Garden: And the having too great a Quantity of Walling, is often the Occasion that so many scandalous Trees are frequently to be seen in large Gardens, where there is not due Care observ'd in their Management.

And besides, the Borders of Pleasure-Gardens are generally too narrow for the Roots of Fruit-Trees, as will be shewn in its proper Place.

The Height of Garden-Walls should be twelve Feet, which is a moderate Proportion; and if the Soil be good, it may in time be well furnish'd with bearing Wood in every Part, especially that Part plant'd with *Pears*, notwithstanding the Branches being train'd horizontally from the bottom of the Walls.

I would recommend the *White Thorn*, the *Holly*, the *Black Thorn* and *Crab*, for Outward Fences to a good Ground; but I do not approve of the intermixing them.

The *White Thorn* is the best *Quick* to plant; because it is the most common, and is esteem'd the handsomest.

The *Black Thorn* and *Crab* make very good Fences, and are to be rais'd as the *White*

Thorn. But if the Kernels of *Apples* or *Crabs* be sown, it is best to sow the *Pommace* with them, and they will come up the sooner, i. e. the first Year.

If *Crab-Stocks* be planted together like *Quick*, they make excellent Hedges, and so will some Sorts of *Plums*.

The *Black Thorn* is not accounted so good for Fences as the *White Thorn*, because it is apt to run more into the Ground, and is not certain as to the Growing: But then, on the other hand, the Bushes are by much the better, and are also more lasting than the *White Thorn*, or any other, for dead Hedges, or to mend Gaps: nor are they subject to be cropt by Cattle, as the others are. The richer the Mould is, the better they will prosper; but yet they will grow on the same sort of Soil that the *White Thorn* does.

The *Holly* will make an excellent Fence, and is preferable to all the rest: but it is difficult to be made to grow at the first, and is a slow Grower; but when once it does grow, it makes Amends by its Height, Strength, and Thickness.

It is rais'd either of *Sets* or *Berries*, as the *White Thorn* is, and will lie as long in the Ground before it comes up. It delights most in strong Grounds, but will grow upon the driest Gravel, amongst Rocks or Stones.

The *Berries* lie till the second *Spring* before they come up, therefore they should be prepar'd before they are sown. (For this, see the Article *Holly*.) It will be best to sow 'em in the Place where you design they should grow; and they should be well weeded both before they come up, and afterwards.

French Furs will also do well upon dry Sandy Banks, where few other Plants will grow; but they must be kept very clean at the Bottom, and cut thin, and never suffer'd to grow too high: nor should they be cut in dry Weather, nor late in *Autumn*, nor early in the *Spring*; the doing either of which, is subject to make it die in Patches, which is irrecoverable: nor will it ever break out again from old Wood, if cut close in, after it has been suffer'd long to grow out.

Fences may likewise be made of *Elder*: If the Soil be any thing good, you may stick Sticks of *Elder*, or Truncheons ten or twelve Feet long, slopewise in your Bank, so as to make Chequer-work, and they will make a Fence for a Garden the quickest of any thing, and be a good Shelter.

Elder plant'd on a Bank, the Side of which is wash'd with a River or Stream, will make an extraordinary Fence, and will preserve the Bank from being undermin'd by the Water; because it is continually sending Suckers from the lower Roots, which is of great Advantage where the Stream washes away the Bank.

For Middle Fences in a Garden, the *Yew* is the more tonfile, governable, and durable Plant.

For surrounding Wilderness Quarters, *Elm*, *Lime*, *Hornbeam*, and *Beech* are very proper.

FENNEL; vide *Foeniculum*.

FENNEL

FENNEL-FLOWER; *vide* Nigella.

FERRUM EQUINUM; [so call'd, because the Husk and Seed are so bended as to resemble a Horse-shoe.] Horse-shoe Vetch.

The Characters are;

It hath a papilionaceous Flower, which is succeeded by a flat Pod, distinguish'd into Joints resembling a Half-Moon, or an Horse-shoe, containing Seeds of the same Form.

The Species are;

1. **FERRUM EQUINUM**; *siliqua singulari*. C.B. Horse-shoe Vetch, with a single Pod.

2. **FERRUM EQUINUM**; *siliqua multiplici*. C.B. Horse-shoe Vetch, with many Pods.

3. **FERRUM EQUINUM**; *Germanicum, siliquis in summitate*. C. B. Common Horse-shoe Vetch.

There are some other Varieties of this Plant, which are preserv'd in curious Botanick Gardens; but it is rare that any of them are propagated, except for Variety-sake, they having no great Beauty. The two first Species are brought from Abroad; but the third Sort grows wild upon Chalky Hills in divers Parts of England.

They may be propagated by sowing their Seeds in March upon a dry Soil, in the Places where they are to remain; for they do not well bear Transplanting. The Distance they should be allow'd, ought to be at least a Foot from each other; for they spread upon the Ground, and will cover that Space: These produce their Flowers in June, and perfect their Seeds in August and September.

FERULA; [takes its Name of *Ferendo*, Lat. because the Stalks of this Plant are made use of in supporting the Branches of Trees; or of *Feriendo*, because in Old Time, Sticks or Staves were made of them with which School-Masters used to correct their Scholars.] Fennel-Giant.

The Characters are;

It hath a large succulent Milky Root: The Stalks are spongy and fill'd with Pith: The Flowers consist of many Leaves, which expand in form of a Rose, and grow in an Umbel: Each Flower is succeeded by two large Oval-shap'd flat Seeds, which are very thin, and for the most part turn black when they are ripe: To which may be added, The Leaves are like those of Fennel.

The Species are;

1. **FERULA**; *major, seu femina Plinii*. M. Umb. Pliny's Female Fennel-Giant.

2. **FERULA**; *galbanifera*. Lob. Obs. Broad-leav'd Fennel-Giant.

3. **FERULA**; *Tingitana, folio latissimo lucido*. H. Edin. Broad-leav'd shining Fennel-Giant from Tangier.

4. **FERULA**; *Tingitana, folio angusto, lucido*. H. L. Narrow-leav'd Fennel-Giant from Tangier.

5. **FERULA**; *tenuiore folio*. Narrow-leav'd Fennel-Giant.

6. **FERULA**; *Africana, galbanifera, folio & facie ligustici*. Par. Bat. African Fennel-Giant, with the Face and Leaf of Lovage.

7. **FERULA**; *Africana, galbanifera, folio Myrrhidis*. H. Amst. African Fennel-Giant, with a Sefeli Leaf.

There are several other Varieties of this Plant, which are preserv'd in curious-Botanick Gardens; but as they are of no great Use or Beauty, I shall pass them over in this Place.

The first of these Plants is pretty common in the English Gardens: This, if planted in a good Soil, will grow to the Height of ten or twelve Feet and more, and divides into many Branches, so that it should have a great deal of Room: for if it be planted too near to other Plants, it will over-bear and destroy them. It dies to the Surface every Autumn, and rises again the succeeding Spring. The Flowers are produc'd in June, and the Seeds are ripe in September.

Mr. Ray says, That the People of Sicily use the Pith of this Plant for Tinder to light their Fires. And if this was practis'd by the Antients, we may easily guess why the Poets feign'd, that *Prometheus* stole Fire from Heaven, and carry'd it to the Earth in an hollow *Ferula*.

The second, sixth, and seventh Sorts are suppos'd by some Authors to afford *Galbanum*, which, they say, is an Exudation from some of these Plants: but this at present is not determin'd; for, if any of the three, the seventh is thought to be the best.

These Plants are all very hardy, except the sixth and seventh Sorts, which being Natives of a warm Country, do require to be hous'd in Winter. They are all propagated by sowing their Seeds, which should be done soon after they are ripe: but if they are kept until Spring, they must be sown very early, and in a shady Situation; otherwise the Seeds are subject to miscarry. They delight in a light, moist Soil, and must be planted at least two Feet and an half asunder; for they spread very far. The Roots will abide many Years, if suffer'd to remain undisturb'd: but if they are transplanted when old, they seldom thrive well afterwards. These being Plants only for Curiosity, one of each Sort is sufficient for a Garden; since they are of no great Beauty, and require much Room.

The sixth and seventh Sorts should be sown soon after the Seeds are ripe, in a Pot of good Earth, which should be plac'd under a Hot-bed Frame during the Winter-Season, to preserve it from the Frosts: And when the Plants are come up in the Spring, they should be transplanted each into a separate Pot, and may be expos'd in Summer, but in Winter should be defended from Frosts. They must be shifted into larger Pots, as they increase in Bulk. The best Season for removing them is in September, before they are hous'd. They require frequent Waterings, and to have as much Air as possible in mild Weather.

FICOIDES; [is so call'd of *Ficus*, Lat. a Fig, because the Fruit of it resembles a Fig; it is also call'd *Azoides*, of *Αἴζω*, Gr. i.e. Ever-living, because it is always green, and resembles the *Sedum*.] Fig-Marygold.

The Characters are;

The whole Plant is succulent, and has the Appearance of Houseleek: The Leaves grow opposite by Pairs: The Cup of the Flower is fleshy, and divided into five Parts almost to the Bottom: The Flower consists of many Leaves, which are divided into small Parts, and do expand in form of a Marygold: The Flower is succeeded by a succulent Fruit, which is divided into five or more Cells, which are full of small Seeds.

The Species are;

1. **FICOIDES**; seu *ficus aizoides*, *Africana*, major, procumbens, triangulari folio ensiformi. *H. L. Boerb. Ind.* Great, trailing African *Ficoides*, with a triangular Sword-shap'd Leaf.
2. **FICOIDES**; seu *ficus aizoides*, *Africana*, major, procumbens, triangulari folio, fructu maximo eduli. *Ficus Hottentottorum*, vulgò. *H. L.* Great trailing African *Ficoides*, with a triangular Sword-shap'd Leaf, and a large eatable Fruit, commonly call'd the *Hottentot F.g.*
3. **FICOIDES**; *Afra*; caule lignoso, erecta, folio triangulari, ensiformi scabro, flore luteo magno. *Boerb. Ind.* Upright African *Ficoides*, with a woody Stalk, and a triangular, rough, Sword-shap'd Leaf, and a large yellow Flower.
4. **FICOIDES**; *Afra*, arborescens, erecta, folio triangulari, longissimo, confertim nato purpurascens, flore luteo magno. *Boerb. Ind.* Upright Tree-like African *Ficoides*, with a long triangular Leaf, and a large yellow Flower, commonly call'd Pink-leav'd *Ficoides*.
5. **FICOIDES**; *Afra*; folio triangulari, ensiformi, glauco, crasso, ad margines laterales paucis inermibus spinis aculeato, flore in longo pedunculo aureo. *Boerb. Ind.* African *Ficoides*, with a thick triangular Sword-shap'd Leaf, arm'd with Spines on the Edges, and a yellow Flower growing upon a long Foot-stalk, commonly call'd, the Dog's-Chap *Ficoides*.
6. **FICOIDES**; *Afra*, folio triangulari, ensiformi, crasso, brevi, ad margines laterales multis majoribusque spinis aculeato, flore aureo ex calice longissimo. *Boerb. Ind.* African *Ficoides*, with a triangular Sword-shap'd Leaf, having many large Spines upon their Edges, and a yellow Flower with a long Calyx, commonly call'd, the prickly Dog's-Chap *Ficoides*.
7. **FICOIDES**; *Afra*; folio triangulari, securiformi, flore aureo stellato. *Boerb. Ind.* African *Ficoides*, with a triangular Hatchet-shap'd Leaf, and a yellow starry Flower, commonly call'd the Stag's-Horn *Ficoides*. This Sort expands its Flowers only in the Evening.
8. **FICOIDES**; *Afra*; folio triangulari, longo, marginis inferioris supremo aculeato, flore violaceo. *Boerb. Ind.* African *Ficoides*, with a long triangular Leaf, having Spines at the Extremity on the under Part of the Leaves, and a Violet-colour'd Flower, commonly call'd, the Daisy-flower'd *Ficoides*.
9. **FICOIDES**; *Africana*, frutescens, perfoliata, folio triangulari, glauco, punctato, cortice lignoso, candido tenui. *T. Ac. Reg.* Shrubby African *Ficoides*, with perfoliated, triangular, glaucous Leaves, and a slender, white, linous Bark, commonly call'd, the lesser Horn'd *Ficoides*.

10. **FICOIDES**; *Afra*; folio triangulari, glauco, perfoliato, brevissimo, apice spinoso. *Boerb. Ind.* *flore purpureo.* African *Ficoides*, with a triangular, short, perfoliate, glaucous Leaf, having Spines upon the Top, and a Purple Flower, commonly call'd, the large Horn'd *Ficoides*.

11. **FICOIDES**; *Africana*, aculeis longissimis & foliatis nascentibus ex alis foliorum. *Tourn. Ac. Reg.* African *Ficoides*, with long Spines growing from the Wings of the Leaves.

12. **FICOIDES**; *Afra*, folio triangulari ensiformi brevissimo, flore dilute purpurascens filamentoso. *Boerb. Ind.* African *Ficoides*, with a short triangular Sword-shap'd Leaf, and a purplish-colour'd Flower.

13. **FICOIDES**; seu *ficus aizoides*, *Africana*, folio triangulari crasso, glauco brevi, ad tres margines aculeato. *Boerb. Ind.* *flore purpurascens.* African *Ficoides*, with a short, thick, glaucous, triangular Leaf, with three Spines on the Edges, and a purplish Flower.

14. **FICOIDES**; *Afra*; folio triangulari, glauco brevissimo, crassissimo, margine non spinoso. *Boerb. Ind.* *flore purpurascens.* African *Ficoides*, with a very short, thick, triangular glaucous Leaf, without Spines on the Edge, and a pulplish-colour'd Flower.

15. **FICOIDES**; *Afra*; folio triangulari, glauco brevissimo, crassissimo, margine spinoso, caule & flore purpureo. African *Ficoides*, with a very short, thick, glaucous Leaf, with Spines upon the Edge, and a purple Stalk and Flower.

16. **FICOIDES**; *Afra*; fruticans, folio triangulari, scabro, tenui, flore violaceo. *Boerb. Ind.* African shrubby *Ficoides*, with a triangular rough, narrow Leaf, and a Violet-colour'd Flower.

17. **FICOIDES**; *Afra*; folio triangulari, viridi, longo aspero, flore violaceo. *Boerb. Ind.* African *Ficoides*, with a long, green, rough, triangular Leaf, and a Violet-colour'd Flower.

18. **FICOIDES**; *Afra*; folio triangulari, crasso succulentissimo. *Boerb. Ind.* *flore aureo.* African *Ficoides*, with a thick, succulent, triangular Leaf, and a yellow Flower.

19. **FICOIDES**; *Afra*; folio triangulari, longo succulento, caulibus rubris. *Boerb. Ind.* *flore luteo.* African *Ficoides*, with a long, succulent, triangular Leaf, red Stalks, and a yellow Flower.

20. **FICOIDES**; seu *ficus aizoides*, *Africana*, erecta, arborescens, lignosa, flore radiato, primo purpureo, dein argenteo interdiu, clauso, noctu aperto. *Boerb. Ind.* African upright Tree-like *Ficoides*, with a radiated Flower, first of a Purple, and afterwards a Silver Colour, opening in the Night, but clos'd in the Day.

21. **FICOIDES**; *Afra*; arborescens, folio tereti, flore candido, noctu aperto interdiu clauso. *Boerb. Ind.* African Tree-like *Ficoides*, with a taper Leaf and white Flower, opening in the Night, but shut in the Day.

22. **FICOIDES**; *Afra*; arborescens, folio tereti, glauco, apice purpureo crasso. *Boerb. Ind.* *flore violaceo.* African Tree-like *Ficoides*, with a thick, taper, glaucous Leaf, tip with Purple, and a Violet-colour'd Flower.

23. **FICOIDES**; *Afra*; folio tereti, procumbens, flore coccineo. *H. L.* African trailing *Ficoides*,

Ficoides, with a taper Leaf, and a Scarlet Flower.

24. *FICOIDES*; seu *ficus aizoides*, *Africana folio longo, tenui, flore aurantio*. Boerb. Ind. African *Ficoides*, with a long, narrow Leaf, and an Orange-colour'd Flower.

25. *FICOIDES*; *Afra, fruticosa, caule lanuginoso, folio tereti parvo, brevi guttato, flore violaceo*. Boerb. Ind. African shrubby *Ficoides*, with a woolly Stalk, a small taper spotted Leaf, and Violet-colour'd Flower.

26. *FICOIDES*; *Afra; fruticosa, caule lanugine argentea ornato, folio tereti parvo longo, guttulis argenteis quasi scabro, flore violaceo*. Boerb. Ind. African shrubby *Ficoides*, with a white woolly Stalk, a long taper Silver-spotted Rough-leaf, and a Violet-colour'd Flower.

27. *FICOIDES*; seu *ficus aizoides, Africana, folio variegato, aspero, ad apicem stellâ spinosâ ornato, flore violaceo*. Boerb. Ind. African *Ficoides*, with a rough party-colour'd Leaf, tipped with a Star of Spines, and a Violet-colour'd Flower.

28. *FICOIDES*; *Afra; lignosa, folio tereti aspero ad apicem stellâ spinosâ, flore violaceo*. African woody *Ficoides*, with a taper rough Leaf, tipped with a Star of Spines, and a Violet-colour'd Flower.

29. *FICOIDES*; seu *ficus aizoides, Africana, erecta, tereti folia, floribus albis umbellatis*. Par. Bat. Upright African *Ficoides*, with a taper Leaf and white Flowers, growing in an Umbel.

30. *FICOIDES*; *folio tereti, caule viridi ramossimo, flore parvo candido*. An. *Ficoides*, *Neapolitana flore candido*. H. L. African *Ficoides*, with a taper Leaf, a green branching Stalk, and a small white Flower.

31. *FICOIDES*; *Africana, folio, tereti longo tenui guttulis argenteis, flore parvo purpurascens, radice crassissimâ*. African *Ficoides*, with a long taper Leaf spotted with white, a small purplish Flower, and a thick knobbed Root.

32. *FICOIDES*; *Africana, humilis, folio tereti crasso succulento flore sulphureo, pedunculo brevi*. Dwarf African *Ficoides*, with a thick taper succulent Leaf, and a Sulphur-colour'd Flower, with a short Foot-stalk, commonly call'd, the Quince-leav'd *Ficoides*.

33. *FICOIDES*; *Africana, procumbens, folio tereti longo, flore violaceo*. African trailing *Ficoides*, with a long taper Leaf, and Violet-colour'd Flower.

34. *FICOIDES*; *Afra; acaulos, foliis latissimis crassis lucidis conjugatis, flore aureo amplissimo*. Tourn. Ac. Reg. African *Ficoides* without Stalks, and with broad thick shining Leaves growing by Pairs, and a large yellow Flower.

35. *FICOIDES*; *Afra; acaulos, foliis latissimis crassissimis lucidis conjugatis, flore aureo amplo, sine pedunculo*. Boerb. Ind. African *Ficoides* without Stalks, and broad thick shining Leaves growing by Pairs, and a large yellow Flower without Foot-stalks.

36. *FICOIDES*; *Afra; foliis latissimis, crassis lucidis cruciatim positiss*. Boerb. Ind. African *Ficoides*, with broad thick Leaves, growing cross-wise.

37. *FICOIDES*; *Africana, procumbens, foliis latis crassis cruciatim positiss, flore albo medio purpurascens*. African trailing *Ficoides*, with broad thick Leaves growing cross-wise, and a white Flower with a purplish Middle.

38. *FICOIDES*; *Africana procumbens, foliis latis, conjugatis, flore candido*. African trailing *Ficoides*, with broad Leaves growing by Pairs, and a white Flower.

39. *FICOIDES*; *Africana, folio plantaginis undulato micis argenteis ad spersos*. Tourn. Ac. Reg. African *Ficoides*, with a wav'd Plantain Leaf cover'd with Silver Drops, commonly call'd the Diamond *Ficoides*.

40. *FICOIDES*; *Hispanica, annua, Lychnidis folio*. Jess. Spanish annual *Ficoides*, with a Campion Leaf.

41. *FICOIDES*; *Canariensis, procumbens, portulaca folio*. Jess. Canary trailing *Ficoides*, with a Purslain Leaf.

There are some other Sorts of this Plant in the Botanick Gardens Abroad, but these here mention'd are what we have at present in the English Gardens.

These are all abiding Plants, (except the three last mention'd) and may be propagated by planting Cuttings of any of the Kinds, either in June or July; observing to let them lie two or three Days, or more, in a dry Place after they are cut off from the Plants, before they are planted, according as they are more or less succulent: The Sorts that are woody, need only to be planted upon an old Hot-bed, shading and watering them according to the Heat and Drought of the Season; but the succulent Kinds should be planted in Pots fill'd with light sandy fresh Earth, and should be plung'd into a moderate Hot-bed, to facilitate their taking Root; and these should have but little Moisture, especially before they are rooted, for much Wet will certainly destroy them.

When the Plants have taken Root, which will be in about a Month's Time, you should expose them to the open Air gradually: Those which were planted in Pots, may be drawn out of the Hot-bed at first, and remov'd into a Glass Stove, where they may be inur'd by degrees to bear the Weather: But those planted upon the old Hot-bed may remain unremov'd until August, when they should be carefully taken up, and planted into Pots fill'd with light fresh sandy Earth, and set in a Situation where they may enjoy the Morning Sun only, until they have taken fresh Root, when they may be expos'd to the open Air until the latter End of September or the Beginning of October; at which time they must be remov'd into the Conservatory, which should be a light airy Glass-case, so built and contriv'd as to admit of a large Portion of free Air whenever the Weather is mild; but in hard frosty Weather, the Cold may be excluded. The Structure of this will be defin'd under the Article *Stove*, to which I shall refer the Reader.

During the Winter-season you must carefully observe to open the Glasses every Day when the Weather is mild; for if you keep them closely shut up, the Plants will grow sickly, and

and drop their Leaves. You must also observe to pick off all decay'd Leaves as often as they appear, which, if suffer'd to remain upon the Plants, would communicate a Distemper to them, and be very apt to rot them. You should also give them frequent Waterings in mild Weather, especially such of 'em as are Woody: but do not give 'em too much at once; for when the Earth, in Pots which are placed in the House, is too much saturated with Moisture, it will not dry again during the Winter-season, for want of the Benefit of the Sun and Air, which are the two great Instruments in dissipating Humidity; and this is often the intire Destruction of the Plant: whilst on the other hand, some People, out of too great Care to these Plants, let them suffer for want of Water and free Air in Winter, under a Notion of their being so very tender, as to be impatient of the least Cold or Moisture: whereas in fact, they are very hardy, and are seldom destroy'd with less Cold than hard Frost; for I have had some Sorts endure the open Air in a warm Border for two or three Winters which prov'd mild; and such of these Plants as had thus endured the Cold, produc'd a much greater Quantity of Flowers, than those which had been preserv'd in a Stove with great Care: and it hath been chiefly owing to our managing them tenderly in Winter, that we annually lost so many of them; for since I have treated 'em in a different Manner, I have rarely lost a single Plant.

The three last-mention'd Sorts are Annuals, and require to be sown every Year. The 38th Sort is a very beautiful Plant, being all over set very thick with transparent Crystal-like Drops, as if cover'd with small Icicles; from whence it is by some call'd the Frosty Ficoides. The Seeds of this Plant should be sown very early in the Spring upon a good Hot-bed; and when the Plants are come up, they must be planted into small Pots fill'd with fresh light sandy Earth, and plung'd into another Hot-bed; and as that Hot-bed declines its Heat, they should be remov'd into a third Hot-bed, which will bring them forward towards Flowering; and in July these Plants may be expos'd to the open Air by degrees, by which Time their Flowers will appear, and be hereby render'd strong, and capable to produce good Seeds: but you should always confine in small Pots such Plants as you design for Seed, never suffering them to root through the Hole in the Bottom of the Pot into the Ground, which would occasion their growing to be much larger and stronger Plants: but then their Strength would be diverted from the Seed-Vessels to nourish and produce strong Shoots: so that it seldom happens that the strongest Plants produce good Seeds. But if you would have some of these Plants of a large Growth, you should shake them out of the Pots into an old Hot-bed of Tanners Bark, where their Roots and Branches will extend to a considerable Length. I have had one of these Plants in such a Bed, which has spread above a Yard square; and the Leaves and Branches were of a prodigious Size.

The Flowers of this Plant are of no great Beauty; but the Oddness of the whole Plant renders it worthy of a Place in every curious Garden.

The 39th and 40th Sorts are Plants of little Beauty, and are seldom preserv'd but in curious Botanick Gardeds, for Variety.

The 1st, 2d, and 21st Sorts I have never yet seen flower, altho' there are many large Plants of each Kind in divers Gardens in England. I had one Plant of the 21st Sort which had been planted into an open Border against a Wall, that was set very thick with Buds in almost every part of the Plant, late in the Autumn 1726; but a sudden, sharp Frost happening, destroy'd the whole Plant.

The 3d, 4th, 16th, 17th, 22d, 23d, 24th, and 25th Sorts do branch out and grow shrubby and produce large Quantities of very beautiful Flowers, which being expanded in the Heat of the Day, afford a very agreeable Prospect, and are well worth cultivating in every Collection of Plants, for their Beauty; as are all the Dwarf succulent Sorts, for their Oddness; and some of them produce beautiful Flowers, tho' not in such Plenty as the former.

These are, some or other of their Sorts, continually in Flower: but their chief Season of Flowering is from April to September; and many of them produce good Seeds: but as their Cuttings seldom fail to take Root, so they are rarely propagated by Seeds in England.

FICUS: The Fig-Tree.

The Characters are;

The Flowers, which are always inclin'd in the Middle of the Fruit, consist of one Leaf, and are Male and Female in the same Fruit: The Male Flowers are situated toward the Crown of the Fruit; and the Female, which grow near the Stalk, are succeeded by small hard Seeds: The intire Fruit is for the most part turbinate: and globular, or of an Oval Shape, is fleshy, and of a sweet Taste.

The Species are;

1. Ficus; sativa, fructu violaceo, longo, intus rubente. Tourn. The long Blue Fig.
2. Ficus; sativa, fructu oblongo, albo mellifluo. Tourn. The long White Fig.
3. Ficus; sativa, fructu parvo, albo fugaci. Tourn. The early White Fig, by some falsely call'd the Marseilles Fig.
4. Ficus; sativa, fructu globoso, albo, mellifluo. Tourn. The great round White Fig.
5. Ficus; sativa, fructu parvo, fusco, intus rubente, Tourn. The small Brown Fig.
6. Ficus; sativa, fructu longo, majori, nigro, intus purpurascente. Tourn. The great long black Fig.
7. Ficus; sativa, fructu globoso, fusco, intus rubente. Tourn. The Brunswick Fig.
8. Ficus; sativa, fructu parvo, subrotundo, albo, striato, intus roseo. Tourn. Roundish White-strip'd Fig.
9. Ficus; sativa, fructu viridi, longo pediculo insidente. Tourn. The Green Fig.
10. Ficus; sativa, fructu parvo, serotino, albo, intus roseo, mellifluo, cute lacera. Tourn. The Marseilles Fig.
11. Ficus;

11. *Ficus*; *sativa*, *fructu flavescente*, *intus suave rubente*. *Tourn.* The Yellow Fig.

12. *Ficus*; *sativa*, *fructu majori*, *violaceo*, *oblongo*, *cute lacera*. *Tourn.* Great long Violet Fig.

13. *Ficus*; *sativa*, *fructu magno*, *rotundo*, *depresso spadiceo*, *circa umbilicum debiscente*, *intus suave rubente*. *Garid.* The Rose Fig.

14. *Ficus*; *sativa*, *fructu magno*, *rotundo*, *albo*, *mellifluo*, *foliis magis dissectis*. The great White Turkey Fig, with deeply-cut Leaves.

15. *Ficus*; *sativa*, *fructu longo*, *majori*, *nigro*, *intus albo serotino*. *Tourn.* The great Black Fig, with a white Pulp.

16. *Ficus*; *sylvestris*, *Cretica*, *folio non diviso*, *leviter crenato*. *T. Cor.* The Candia wild Fig, with undivided Leaves, falsely call'd the Sycamore-Tree.

17. *Ficus*; *Americana*, *latiori folio venoso*, *ex Curacao*. *Pluk. Alm.* The Broad-leav'd American Fig.

18. *Ficus*; *Malabarensis*, *folio cuspidato*, *fructu rotundo parvo gemino*. *D. Syen. Pluk. Alm.* The Malabar Fig, or Indian God Tree.

The first fifteen Sorts are cultivated in curious Gardens for their Fruits, which are esteem'd, by all delicate Palates, amongst the richest Sorts of Fruits; tho' few vulgar Tastes care for 'em, whereby they are often planted in Places expos'd, where few other Fruits would escape being stoln. In *England* we have but few Sorts of this Fruit, compar'd with the vast Varieties with which the Southern Parts of *France* and *Italy* abound: Tho' it is to be hop'd that in a few Years we shall be supply'd with most of their curious Sorts; especially since we see yearly, that great Numbers of People come to relish 'em. But one great Discouragement to the Propagation of these Trees, was the Unskilfulness of the *English* Gardeners in their Culture and Management. I shall therefore begin with an Account of the Planting, Increasing, and Pruning of these Trees; which I shall treat as clear as possibly I can, and only mention the Methods used, with which I have had great Success.

The common Method of propagating these Trees is from Suckers which come up from the Roots of old Trees. But this is what I would never advise; for these Plants, when grown large, are much more subject to produce Suckers again, than those rais'd by Layers, which are by far the best rooted and most promising Plants: Therefore I would always make choice of the latter Method, especially since they are very easy to be propagated that Way: for if you lay down the Branches in *February*, they will be fit to remove by the succeeding *February*, which is the best time to transplant them; because those planed in Autumn are very apt to be destroy'd, especially if the Winter should prove hard, or the Soil be moist into which they are planted.

The best Soil for *Figs* in *England*, is such as hath a gravelly, chalky, or stony Bottom, with a light dry Surface: for altho' a strong Soil will produce vigorous Branches, and large Leaves; yet the Fruit will not be in such

Plenty, nor so well tasted, as those which grow on a poor and dry Soil.

Fig-Trees should always be planted in a free open Situation; not under the Drip of Trees, nor shaded by Buildings, &c. But there are very few Sorts that will ripen well with us in *England*, most of them requiring a good South, South-East, or South-West Wall: for although they will grow very well against a North or East-aspected Wall; yet the Fruit will be very poor, (if any are produc'd) ill-tasted, and late ripe.

Those Trees which are planted for Standards in the open Air will require very little Culture or Management: The chief Thing to be observ'd, is, to cut out all dead or decaying Branches, as also all such as cross each other, that the Middle of the Tree may not be too much crowded with Branches. The best Season for this Work is in *October*, when the Leaves begin to decay; at which time you should also divest the Branches of all the latter Crop of *Figs*, which, by being suffer'd to remain upon the Tree, will, with the first Frost, rot and decay, and thereby infect the tender Branches: For by several Experiments made by the Reverend and Learned Mr. *Hales* and my self, we found that all those Branches which were divested of the *Figs* at that Season, remain'd perfectly sound, and produc'd Fruit in Plenty the succeeding Year; whereas the other Branches of the same Tree whereon the Fruit were left, were almost totally destroy'd in the Winter. The Reason for my making choice of this Season, is, because at that time they are not so subject to bleed; and the Wounds then made, if cut close and smooth, will heal over in a short time: but it must be done early in the Autumn, before the Frosty Weather comes on, which would be very apt to enter the Places where such Wounds were made, and prove very hurtful to the Tree.

But I shall next treat of the Management necessary for *Wall Fig-Trees*, which is, perhaps, as little understood, as any Part of Gardening, not only in *England*, but also in *France*, *Holland*, and most other Countries. In *France*, great Numbers of these Trees are planted in Tubs or Cases, and are every Winter preserv'd in Green-houses, with *Oranges*, *Myrtles*, &c. This indeed may be a very good Method to obtain early *Figs*, provided they are rightly manag'd; which, I think, can hardly be done, if intermix'd with other Kinds of Trees, whereby their Branches are apt to mould and suffer, for want of a sufficient Quantity of free Air, which these Trees should always have in open mild Weather. Besides, the Fruit will be apt to come out very early in the Season, especially if the House is kept warm, whereby they will be liable to many Accidents in the Spring of the Year. So that, upon the whole, I would never advise this Practice in *England*, unless in such Places where they have an open airy Glass-Case, in which there are no other Sorts of Plants.

Therefore the surest Method is, to plant 'em against warm Walls, and upon a dry warm

M m m

Soil.

Soil. The Distance these Trees should be planted ought never to be less than twenty Feet, supposing the Wall to be fourteen or more Feet in Height; for when they are planted too near, the Branches are train'd upright, and thereby cover the Walls in a few Years with old Wood, so that there is no younger Branches to produce Fruit but what are situated at the extreme Parts of the Tree, or stand forward from the Wall, which is a very great Fault, as shall be hereafter demonstrated. In the Middle, between the *Fig-Trees*, may be planted a Vine, which may be preserv'd to bear Fruit until the *Fig-Trees* do cover the Wall; at which time they should be intirely taken away; for they should by no means be suffer'd to intermix their Shoots amongst the *Figs*, which would prevent the Ingrefs of the Air, which is absolutely necessary to give the Fruit a fine racy Flavour.

In the Summer, when the *Fig-Trees* begin to shoot, you should train the Branches horizontally to the Walls, (as is directed for other Fruit-Trees) for if they are suffer'd to grow all the Summer without Management, their Shoots will be too stubborn to be drawn regularly to the Wall: Nor should you suffer any foreright Shoots to be produc'd upon your young Trees; but, on the contrary, as fast as they appear, you should rub off their Buds. At *Michaelmas*, (as I said before) is the best Season for pruning and nailing these Trees, not only for the Reasons before assign'd, but also because their Shoots being nail'd close to the Wall before the severe Frosts come on, will be less liable to be injur'd thereby.

The main Things to be observ'd in the pruning of older Trees, are, 1st, Always to take care to have a Supply of young Branches in every Part of the Tree, for it is those only which produce Fruit: 2dly, Never to shorten any of the Shoots at the Autumn Pruning, which would intirely deprive you of Fruit, since it is chiefly upon the Wood of the last two Years that it is produc'd: 3dly, Always observe to nail your young Fruit-branches close to the Wall, whereby they will not be destroy'd by Frost, and the Fruit will be forwarded at least a Fortnight or three Weeks in the Spring, which is of great Consequence to us in *England*: 4thly, Never lay in your old Branches too thick, which is a very common Fault amongst Gardeners; for as the Shoots are vigorous, and the Leaves of these Trees very large, so their Distance ought never to be less than ten or twelve Inches: So that as young Branches increafe, the old ones should be intirely cut out; which may be done in the *Autumn* with as much Safety as to any other Tree: 5thly, In order to produce young Branches, you may stop the leading Bud of young vigorous Shoots in *April*, or the Beginning of *May*, which will occasion the Side-buds to break out into lateral Branches, whereby the Wall may be kept constantly furnish'd with young Wood; but I would by no means advise the doing of this too often, nor should it be done later in the Year: for multiplying Branches too much, is of as bad Consequence

as having too few, for it will occasion their being weak and unfruitful; and if it is done in *June* or *July*, it will only occasion the Buds to produce *Figs* in great Plenty, which will never come to good so late in the Year, and will greatly weaken the tender Fruit-Branches, and prevent their bearing the next *Spring*.

If the Winter should prove extreme sharp, it will be necessary to cover your choicest Sorts of *Fig-Trees*, either with *Straw*, *Reeds*, *Pease-Haulm*, or some other such like Covering, which will preserve the tender Fruit-branches from being injur'd; for want of which Care, in the Winter *Anno* 1728, the *Fig-Trees* suffer'd very much in most Parts of *England*: By this Method your Fruit will be greatly forwarded, but you should be very careful not to remove your Covering too early in the *Spring*, nor to do it all at once, but open them first in the Day-time, and cover them again at Night, and so by degrees inure them to the open Air. In some Places where this Method has been carefully observ'd, I have seen ripe *Figs* almost a Month sooner than where they were not cover'd, and the Fruit in much greater Plenty.

These Trees do very well against the warm Side of an House, or other large Building, where they have a great Compass of Walling; and the higher these Trees are train'd from the Ground, the better the Fruit is tasted, especially if it be against a Chimney, where it may enjoy some Share of Warmth thro' the Bricks: And *Figs*, tho' the most delicate of Fruits, being very little esteem'd by vulgar Palates, are less liable to be stoin by Servants or common People than some of the more common Sorts of Fruits.

I am aware, that what I have here advanc'd, in relation to the pruning and dressing of *Fig-Trees*, will be condemn'd by great Numbers of People, who will not give themselves time to consider and examine the Reasons upon which I have founded this Practice, nor to make one single Experiment to try the Truth of it, as being vastly different from the general Practice of most Gardeners, who always imagine, that *Fig-Trees* should never have much pruning, or at least, that they should always be suffer'd to grow from the Wall to some Distance: That by this Management, I have often seen great Quantities of Fruit, I cannot deny, but then this has been only in mild Winters, for it is very certain, that in sharp Frosts few of these outside Shoots escape being greatly injur'd; whereas it rarely happens, that those Shoots which are closely nail'd to the Wall at *Michaelmas* do suffer the least Damage, and the Fruits are always produc'd a Fortnight sooner upon these Branches than they are upon those which grow from the Wall.

The Season also for Pruning, which I have laid down, being vastly different from the common Practice and Opinion of most Gardeners, will also be objected against; but this I am sure, if any one will but make Trial of it, I doubt not but his Experience will confirm what I have here advanc'd; for as one great

Injury

Injury to this Tree, proceeds from the too great Effusion of Sap at the wounded Parts, so by this *Autumn* pruning this is prevented: for at that Season, all the Parts of *European* Trees which cast their Leaves, are less replete with Moisture than at any other time of the Year; for by the long Continuance of the Summer's Heat, the Juices of Plants having been exhausted in the Nourishment and Augmentation of *Wood, Leaves, Fruits, &c.* and also great Quantities being evaporated by Perspiration, the Root not being able to send up a Supply equivalent to this great Consumption, the Branches must contain a much less Quantity of Sap than in the *Spring*, when it has had several Months Supply from the Root, which tho' but small in Proportion to what is sent up when the Heat is greater, yet there being little or no Waste, either by Perspiration or Augmentation, there must be a greater Quantity contain'd in the Branches; which also is easily to be observ'd, by breaking or cutting off a vigorous Branch of a *Fig-Tree* at both Seasons, (the Sap being milky may be readily discern'd) when that cut in *Autumn* shall be found to stop its Bleeding in one Day's time or less; whereas that cut in the *Spring* will often flow a Week or more, and the Wound will be proportionably longer before it heals.

Tho' the List of *Figs* which I have here added, may be greater in Number of Sorts than many People at present know, yet it is very small when compar'd with the great Variety of Sorts which are known in the more Southern Countries of *Europe*; from whence I am in Hopes, in a short Time, I shall be supply'd with many more Kinds than are here mention'd: nor do I think there is any Sort of Fruit deserves more our Care to cultivate and improve than this, and yet it rarely happens that we meet with more than four or five Sorts in most of our curious Fruit-Gardens, when at the same time, perhaps, the Walls are fill'd with great Collections of *Pears* or *Plumbs*, few of which either deserve the Place or Care taken in their pruning &c. or at least would thrive as well if planted in *Espaliers* or *Standards*.

I have not, as yet, seen any *Figs* planted in an *Espalier*, and so can't say how they would succeed; but since some of the Sorts do, in divers Parts of *England*, bear very well in *Standards*, I don't see why they should not be try'd; however, if we should be at the Expence of covering them in hard Winters, there is no doubt but they would succeed very well.

The sixteenth Sort is by many People suppos'd to be the true *Sycamore-Tree* mention'd in Scripture, which is a sort of *Fig* which produces its Fruit out of the old Wood of the Tree, and is very small; but as this Tree has not produc'd any Fruit with us, so I cannot determine whether it be the right Kind or not.

It may not be improper in this place to mention the great Pains which the Inhabitants of the *Levant* are at in the Culture of their *Figs*; and without which (it is generally said

by all the Travellers who have wrote on this Subject, as also by *Pliny*, and other old Naturalists) that their Fruit would fall off and be good for nothing. I shall here set it down as I find it in the Travels of *Monf. Tournefort* chief Botanist to the late King of *France*.

" *Pliny* (says he) observ'd, that in *Zia* they us'd to dress the *Fig-Trees* with much Care; they still continue to do so. To understand aright this Husbandry of *Figs*, (call'd in *Latin* *Caprificatio*) we are to observe, that in most of the Islands of the *Archipelago*, they have two Sorts of *Fig-Trees* to manage; the first is call'd *Ornos*, from the old *Greek* *Erinos*, a wild *Fig-Tree*; or *Caprificus* in *Latin*; the second, is the *Domestick* or *Garden Fig-Tree*: The wild Sort bears three Kinds of Fruit, *Fornites*, *Cratitires*, and *Orni*, of absolute Necessity towards ripening those of the *Garden Fig*.

" The *Fornites* appear in *August*, and continue to *November* without ripening: In these breed small Worms, which turn to a Sort of Gnats, no where to be seen but about these Trees: In *October* and *November* these Gnats of themselves make a Puncture into the second Fruit, which is call'd *Cratitires*, and don't shew themselves till towards the End of *September*: and the *Fornites* gradually fall away after the Gnats are gone: The *Cratitires*, on the contrary, remain on the Tree till *May*, and inclose the Eggs deposited by the *Fornites* when they prick'd them. In *May* the third Sort of Fruit begins to put forth from the same wild *Fig-Trees* which produc'd the other two; this is much bigger, and is call'd *Orni*: When it grows to a certain Size, and its Bud begins to open, it is prick'd in that Part by the Gnats of the *Cratitires*, which are strong enough to go from one Fruit to the other to discharge their Eggs.

" It sometimes happens, that the Gnats of the *Cratitires* are slow to come forth in certain Parts, while the *Orni* in those very Parts are dispos'd to receive them: In which Case the Husband-man is oblig'd to look for the *Cratitires* in another part, and fix them at the End of the Branches of those *Fig-Trees*, whose *Orni* are in fit Disposition to be prick'd by the Gnats: If they miss the Opportunity, the *Orni* falls, and the Gnats of the *Cratitires* fly away. None but those that are well acquainted with this sort of Culture, know the critical Minutes of doing this; and in order to it, their Eye is perpetually fix'd on the Bud of the *Fig*; for that Part not only indicates the Time that the Prickers are to issue forth, but also when the *Fig* is to be successfully prick'd: If the Bud be too hard, and too compact, the Gnat can't lay its Eggs, and the *Fig* drops when this Bud is too open.

" These three Sorts of Fruit are not good to eat: Their Office is to help ripen the Fruit of the *Garden Fig-Trees*, in manner following: During the Months of *June* and *July*, the Peasants take the *Orni* at a time that their Gnats are ready to break out, and

“ and carry them to the Garden *Fig-Trees* :
 “ If they don't nick the Moment, the *Orni*
 “ falls, and the Fruit of the Domestick or
 “ Garden *Fig-Tree* not ripening, will in a
 “ very little time fall in like manner. The
 “ Peasants are so well acquainted with these
 “ precious Moments, that every Morning, in
 “ making their Inspection, they only transfer
 “ to their Garden *Fig-Trees* such *Orni* as are
 “ well condition'd, otherwise they lose their
 “ Crop: 'Tis true, they have one Remedy,
 “ tho' an indifferent one; which is, to strew
 “ over the Garden *Fig-Trees* the *Ascolimbro's*,
 “ a very common Plant there, and in whose
 “ Fruit there are a Sort of Gnats proper for
 “ Pricking: Perhaps they are the Gnats of
 “ the *Orni*, which are us'd to hover about
 “ and plunder the Flowers of this Plant.

“ To sum up all in a Word: The Peasants
 “ so well order the *Orni*, that their Gnats
 “ cause the Fruit of the Garden *Fig-Tree* to
 “ ripen in the Compass of forty Days. These
 “ *Figs* are very good green: When they
 “ would dry 'em, they lay 'em in the Sun for
 “ some time, then put 'em in an Oven to
 “ keep 'em the rest of the Year. Barley-bread
 “ and dry'd *Figs* are the principal Subsistence
 “ of the Boors and Monks of the *Archipelago*.
 “ But these *Figs* are very far from being so
 “ good as those dry'd in *Provence*, *Italy*, and
 “ *Spain*; the Heat of the Oven destroys all
 “ their Delicacy and good Taste: But then,
 “ on the other hand, this Heat kills the Eggs
 “ which the Prickers of the *Orni* discharg'd
 “ therein; which Eggs would infallibly pro-
 “ duce small Worms that would prejudice
 “ these Fruits.

“ What an Expence of Time and Pains is
 “ here for a *Fig*, and that but an indifferent
 “ one at last! I could not sufficiently admire
 “ the Patience of the *Greeks*, busy'd above
 “ two Months in carrying these Prickers from
 “ one Tree to another. I was soon told the
 “ Reason; One of their *Fig-Trees* usually
 “ produces between Two and Three hundred
 “ Pounds of *Figs*, and ours in *Provence* sel-
 “ dom above Twenty-five.

“ The Prickers contribute perhaps to the
 “ Maturity of the Fruit of the Garden *Fig-Tree*,
 “ by causing to extravasate the nutri-
 “ tious Juice, whose Vessels they tear asunder
 “ in depositing their Eggs: Perhaps too,
 “ besides their Eggs, they leave behind them
 “ some sort of Liquor proper to ferment
 “ gently with the Milk of the *Fig*, and to
 “ make their Flesh tender. Our *Figs* in *Pro-
 vance*, and even at *Paris*, ripen much sooner
 “ for having their Buds prick'd with a Straw
 “ dipt in Olive-Oyl. *Plums* and *Pears* prick'd
 “ by some Insect, do likewise ripen much the
 “ faster for it; and the Flesh round such
 “ Puncture is better-tasted than the rest. It
 “ is not to be disputed but that considerable
 “ Change happens to the Contexture of Fruits
 “ so prick'd; just the same as to the Parts of
 “ Animals pierc'd with any sharp Instrument.

“ 'Tis scarce possible well to understand
 “ the ancient Authors who have treated of
 “ Caprification, (or husbanding and dressing

“ the wild *Fig-Tree*) if one is not well ap-
 “ priz'd of the Circumstances; the Particulars
 “ whereof were confirm'd to us not only at
 “ *Zia*, *Tinos*, *Micone*, and *Scio*, but in most
 “ of the other Islands.”

The seventeenth and eighteenth Sorts here
 mention'd are very tender Plants, being Inha-
 bitants of warm Countries: I receiv'd Seeds
 of both these Sorts from *Jamaica*, from which
 I rais'd many Plants, some of which are grown
 to a considerable Size: and the seventeenth
 Sort has push'd out many small *Figs* from the
 Joints, but they dropt off in a short time
 without coming to Maturity.

The eighteenth Sort is call'd the *Indian
 God Tree*, it being a Tree under which the
 religious *Indians* perform their Worship.

These are both very handsome Plants, and
 deserve a Place in all curious Collections of
 Exotick Trees: They may be propagated by
 Layers, as the common *Fig*, but should be
 planted in Pots of fresh Earth, and preserv'd
 in Stoves: In the Summer they may be ex-
 pos'd during the Months of *July* and *August*,
 but must be remov'd into Shelter early in
September. During the Winter-season they
 will require frequent Waterings; provided the
 Stove is kept to a good Degree of Heat,
 otherwise they must be water'd very sparingly.
 The Temper of Heat which these Plants do
 best agree with in the Winter, is about the
 Temperate Point, as mark'd on Mr. *Fowler's*
Botanical Thermometers: for in a much greater
 Degree of Heat they will grow too freely in
 Winter; and in a less, they will be apt to drop
 their Leaves, and lose their leading Bud,
 whereby the Beauty of the Tree will be greatly
 impair'd. But if you are desirous to have these
 Trees grow to a large Size, and in a short
 Time, you should plunge their Pots into Tan-
 ners Bark, which will cause them to make a
 considerable Progress. I have had Plants of
 the seventeenth Sort, which, by this Manage-
 ment, have been eight Feet high in two Years
 from the Time of sowing the Seeds, and the
 Leaves have been prodigiously large and fair.

FICUS INDICA; vide *Opuntia*.

FILACEOUS ROOTS; such as are full
 of Filaments, i. e. of small Threads or Strings

FILAGO; vide *Gnaphalium*.

FILBERT; vide *Corylus*.

FILIPENDULA, [of *Filam* a Thread, and
pendere, Lat. to hang, so call'd of pendent
 Threads of the Roots, having little Nodes at
 the Ends.] Dropwort,

The Characters are;

It hath a fibrose Root, with oblong Bulbs or
 Tubers fasten'd to the Bottom of the Fibres:
 The Leaves are finely cut into narrow Segments:
 The Flowers, which consist of six or seven Petals,
 are disposed into a loose Panicle: the Fruit is
 almost round, containing many Seeds, which are
 gather'd into a Head resembling a Tub.

The

The *Species* are;

1. *FILIPENDULA*; *vulgaris*. *An. Molon Plant. C. B.* Common Dropwort.

2. *FILIPENDULA*; *vulgaris*, *An. Molon Plant. folio variegato. H. R. Par.* Common Dropwort, with a variegated Leaf.

3. *FILIPENDULA*; *omni parte major, folio angustiori. Boerb. Ind.* Larger Dropwort, with a narrower Leaf.

The first of these *Species* is used in Medicine, but is seldom cultivated in Gardens: It grows wild in most Parts of *England* upon open Heaths and Commons, as also upon chalky Hills.

The second Sort is a Variety of the first, with strip'd Leaves, and is preserv'd in some curious Gardens by such as delight in variegated Plants.

The third Sort I brought from *Holland*, *Anno 1727*. This differs from the common Sort in being larger in every Part; but the Leaves are narrower, and finer cut.

These Plants may be easily propagated by taking up their Roots in Autumn when the Leaves begin to decay, and parting them into small Heads; which, if planted in an open Situation, will thrive and increase exceedingly. They may also be propagated by sowing their Seeds in Autumn, which will come up the succeeding Spring, and the second Season will flower: But this is not the surest Way to preserve the Kinds; for they may be apt to vary from the Sorts sown.

FILIUS ANTE PATREM, [*i. e. the Son before the Father*;] an Expression which *Botanists* apply to Plants whose Flower comes out before their Leaves.

FILIX; Fern. There are great Varieties of this Plant in the different Parts of the World, but particularly in *America*, as may be seen in the *Natural History of Jamaica*, publish'd by the Worthy Sir *Hans Sloane*, Bart. and in *Plumier's American Ferns*. But as they are Plants which are seldom propagated in Gardens, I shall pass them over in this Place.

FILM; that woody Skin which separates the Seeds in the Pods of Plants.

FIMBRIATED; [of *Fimbria*, Lat. a *Fringe*] a Term relating to the Leaves of Plants when they are jagged on the Edges, having, as it were, a Fringe about them.

FIRE; However foreign at the first View this Article may seem to our present Purpose; yet I am of the Opinion, that a tolerable Acquaintance with its Nature, as far as it can be attain'd, and its Effects, will contribute no small Assistance in forwarding the Work of Vegetation. And tho' the Theory of *Fire* is indeed Philosophical; yet the Consideration of its Effects, and how it operates on Vegetables, will be of no small Use in the Culture of them.

That which best defines and distinguishes *Fire* from every thing else, is its Heating;

and so it may be defin'd, whatsoever warms or heats Bodies.

Heat is something, the Presence of which is best perceiv'd by the Dilatation of the Air or Spirit in the Thermometer. So then, *Fire* is a Body, and a Body in Motion too. The Motion of it is prov'd by its expanding the Air, and that it is a Body by Experiment.

Pure *Mercury* being inclos'd in a Phial with a long Neck, and kept in a gentle Heat for the Space of a Year, will be reduc'd into a Solid, and the Weight also will be increas'd considerably: which Increase cannot proceed from any thing else but the Accession of *Fire*.

The Nature of *Fire* is so obscure and wonderful, that it was held by many of the Antients as a Deity; and several Authors of prime Note have taken great Pains to discover the Mystery of it, without having been able to explain many of the principal Effects thereof. The Learned *Herman Boerhaave* has us'd no less Industry in making a new Set of Experiments, in order to come to a clearer Knowledge of them; and having laid down a new Doctrine of *Fire*, in a Course of Publick Lectures, I shall briefly take Notice of such of them as I apprehend may be of Use.

Fire (says he) in effect, appears to be the general Instrument of all the Motion in the Universe: The constant Tenor of a great Number of Experiments, leave no Room to doubt, but that if there were no *Fire*, all things would instantly become fix'd and immoveable. Of this there are Instances every Winter: For while Frost prevails, the Water, which before was fluid, by a mere Privation of Heat, becomes solid, *i. e.* hardens into Ice, and so remains 'till resolv'd again by *Fire*. Thus, were a Man intirely destitute of Heat, he would immediately freeze into a Statue. And thus the Air it self, which is found in continual Motion, being always either expanding or condensing, would, upon the Absence of *Fire*, contract it self, and cohere into a firm rigid Mass. So also Animals and Vegetables, all Oils, Salts, &c. would, upon the like Occasion immediately congeal.

Altho' this Doctrine of *Fire* here laid down by *Boerhaave*, seems new and extraordinary, at least to those who have been us'd to consider *Fire* in the Light that it has been set in by the Lord *Bacon*, Mr. *Boyle*, and Sir *Isaac Newton*; and tho' we ought to pay great Veneration to those illustrious Authors: yet, in the Judgment of themselves, we should be inexcusable if we should absolutely acquiesce in what they have done, and shut the Door against further and better Information.

It may reasonably be suppos'd that Dr. *Boerhaave* has had an Opportunity of going beyond them, in that, besides all the Experiments and Observations that they have had to build upon, he has had the Advantage of a new Set, which they were unacquainted with.

As to the Nature of *Fire*; the great and fundamental Difference is, Whether it be originally such, form'd thus by the Great Creator Himself, at the Beginning of Things? or,

N n n

Whether

Whether it be mechanically producible from other Bodies, by inducing some Alteration in the Particles of it?

Among the Modern Writers, *Homborg*, *Boerhaave*, the Younger *Lemery*, and *Dr. Gravesande* maintain the former, and the *English* Authors chiefly maintain the latter.

Mouf. Homborg holds, That the Chymical Principle or Element *Sulphur*, which is suppos'd one of the Simple, Primary, Pre-existent Ingredients of all Natural Bodies, is Real *Fire*; and of Consequence, *Fire* is coëval with all Bodies. *Essai du Souffre Principe*, Mem. de l'Acad. Anno 1705.

Dr. Gravesande proceeds much on the same Principle: According to him, *Fire* enters the Composition of all Bodies, is contain'd in all Bodies, and may be separated or procured from all Bodies, by rubbing them against each other, and thus putting their *Fire* in Motion. And he adds, That *Fire* is by no means generated by such Motion. *Elem. Phys. tom. 2. cap. 1.*

Mr. Lemery the Younger asserts the absolute and ingenerable Nature of *Fire*; and also extends it farther. Not contented to confine it as an Element to Bodies, he endeavours to shew, that it is "Equally diffus'd through all Space; is present in all Places; in the void Space between Bodies, as well as the insensible Interstices between their Parts." *Mem. de l'Acad. Anno 1713.*

This last Sentiment falls in with that of *Boerhaave*.

Of the contrary Opinion is the Lord *Bacon*, who, in his *Treatise de Forma Calidi*, deduces from a great Number of Particulars, That *Heat* in Bodies is no other than *Motion*; only a Motion so and so circumstantiated; so that, to produce *Heat* in a Body, nothing is requir'd but to excite such Motion in the Parts of it.

His Opinion is seconded by *Mr. Boyle*, in his *Treatise of the Mechanical Origin of Heat and Cold*, where he maintains the same Doctrine, with new Observations and Experiments; of which, two are as follow:

He says, "In the Production of *Heat*, there appears nothing on the Part either of the Agent or Patient but Motion, and its Natural Effects. When a Smith briskly hammers a small Piece of Iron, the Metal thereby becomes exceedingly hot; yet there is nothing to make it so, except the forcible Motion of the Hammer, impressing a vehement and variously-determin'd Agitation on the small Parts of the Iron; which being a Cold Body before, becomes, by that super-induc'd Commotion of its small Parts, Hot: first, in a more loose Acceptation of the Word, with regard to some other Bodies, compar'd with which, it was Cold before: then, sensibly Hot; because this Agitation sensibly surpasses that of the Parts of our Fingers. And in this Instance, often-times the Hammer and Anvil continue Cold after the Operation. Which shews, that the Heat acquir'd by the Iron was not communicated by either of these Implements, as Heat, but

"produc'd in it by a Motion great enough strongly to agitate the Parts of so small a Body as the Piece of Iron, without being able to have the like Effect upon so much greater Masses of Metal as the Hammer and Anvil: Tho' if the Percussions were often and briskly renew'd, and the Hammer were small, this also might be heated: Whence it is not necessary that a Body it self should be hot to give Heat.

"If a large Nail be driven by a Hammer into a Plank of Wood, it will receive several Strokes on its Head ere it grows Hot: but when it is once driven to the Head, a few Strokes suffice to give it a considerable Heat. For while at every Blow with the Hammer the Nail enters farther into the Wood, the Motion produc'd is chiefly progressive, and is of the whole Nail tending one Way: but when the Motion ceases, the Impulse given by the Stroke being unable to drive the Nail farther on, or break it, must be spent in making a various, vehement, and intestine Commotion of the Parts among themselves, wherein the Nature of Heat consists." See *Heat*.

That *Fire* is the real Cause of all the Changes in Nature, will appear from the following Consideration.

All Bodies are either *solid* or *fluid*; the *solid* of themselves are either commonly suppos'd to be unactive or motionless; the *fluid* both move, and are mov'd.

And all Solids are found to be so much the more firm and contracted, as they have the less *Fire* in them: This is evident in Iron, which when heated, expands it self into a much greater Space than when it was cold; so that any solid and hard Body, by being freed from all *Fire*, would sink into a much less Bulk, and its Parts would cohere more nearly, and with greater Force than before.

As to *Fluids*, they all harden, so as to be visible to the Eye upon the Absence of *Fire*: as Water, by the Cold of a severe Winter, will form it self into a solid Globe, and yet even then contains a great deal of *Fire*; as appears evidently upon applying a *Thermometer* to it, which is capable of falling twenty Divisions lower before it arrive at the Point of the most intense Cold: And hence it is that the Spirit of Wine is kept from freezing in the *Thermometer*, which would undergo the common Fate of other Things, were there not abundantly more *Fire* in it.

So the Air it self expands by a greater Quantity of *Fire*, and condenses by a less; but it still contains a large Quantity of *Fire* where it is most of all contracted: This is evident from the striking of a Flint against a Steel, which is follow'd by Sparks of *Fire*.

Likewise, if this *Fire* could be taken from the Air, it would become solid and perfectly at rest, and by Consequence incapable of Change.

"*Fire* (says *Dr. Gravesande*, in *Element. Phys.*) naturally unites it self with Bodies: And hence it is that a Body brought near to the Fire grows Hot; in which Case it

"also

“also expands or swells: which Expansion is
 “not only observ’d in very solid Bodies, but
 “in those whose Parts do not cohere; in
 “which Case they likewise acquire a great
 “Degree of Elasticity, as is observ’d in Air
 “and Vapours.”

Fire being thus acknowledg’d the Instrumental Cause of all Motion; it remains, that it self be moved. Nay, to move, must be more natural and immediate to *Fire* than to any other Body; and hence some have ventured to make *Motion* essential to *Fire*. But as this is inconsistent with the Notion of Matter, which is defin’d to be inert and passive, and as *Fire* is capable of being prov’d material; we ought rather to agree, that the Motion of *Fire* it self is derived from some higher and Metaphysical Cause. A Property of Perpetual Mobility may indeed be superadded to the other Properties of *Fire*: but it has no natural necessary Connection with them; nor can it be maintain’d with them otherwise than by some Extrinick Efficacy of a Superior Cause.

However, that it is by *Motion* that *Fire* produces its Effects, is evident: And hence the Action of *Fire* cannot make any Alteration in the Elementary Substance of Bodies: For it is necessary that what acts upon an Object, be without that Object; *i. e.* the *Fire* must not penetrate the Elementary Parts, but only enter the Pores and Interstices of Bodies: so that it does not seem capable of making those Transmutations which Sir *Isaac Newton* ascribes to it.

In effect, as to all our Purposes, it may perhaps be said, That *Fire* is always in Motion. For instance: Take six several Sorts of Thermometers, and two Vessels of Water with *Sal Armoniac* mix’d therein, and apply the Thermometers to it; and the Consequence will be, that the Air being condensed in them, the Spirit will descend in all of ’em: Remove the Vessels of Water, and the Air growing warmer, and so rarefying, the Spirit will ascend again. So that the active Force in Air which produces so many Effects, does really all arise from the *Fire* contain’d in it.

Again: As all Bodies plac’d in a very solid Air, do by degrees grow Cold, Motionless, Rigid, &c. *i. e.* though there be still some Remains of *Fire*; and in Proportion, as that is diminished, the Effect is accelerated: it follows, that Cold, a less Degree of Heat, is the Effect of a lesser Action of *Fire*. And so, all Action arises apparently from the same Source.

Then as *Fire* can render the most solid Bodies, as Stones, Metals, &c. fluid, (as appears very evident in large Burning-Glasses, in which Gold it self immediately calcines, and emits Fumes, *i. e.* becomes fluid) so the Want of *Fire* would convert the most fluid Bodies, as Spirits of Wine, &c. into Solids.

Fire is distinguish’d into two Kinds, call’d *elementary* or *pure Fire*, which is such as exists in itself, and alone is properly call’d *Fire*; or *common* or *culinary Fire*, which is rais’d and kindled from the former, and is that which agitates and affects ignited, combustible and moveable Bodies, the Particles of which join-

ing with those of the pure *Fire*, constitute pure *Flame*.

This latter is improperly call’d *Fire*, in that only a small Part of it is real or pure *Fire*; and in ignited Bodies, that which flames, smokes, &c. is not simply *Fire*; whereas pure *Fire*, such as is collected in a Burning-Glass, yields no Flame, Smoke, Ashes, or the like.

Fire may be present in the greatest Abundance, yet without any Heat: This is evident in the Tops of the highest Mountains, illuminated by the Sun, where the Cold is always extremely pinching, and this even under the *Equator*, there being Mountains there which are perpetually cover’d with Snow, tho’ there can be no Want of *Fire*.

So a large Burning-Glass has no Effect, the smallest Warmth cannot be felt in its *Focus*, in a Place where the Sun does not shine, or when the Sun is cover’d with a Cloud; but a Piece of Metal may be seen to melt the very Moment the Sun emerges.

Fire may be in exceeding small Quantity, and yet burn with great Violence: Thus Spirit of Wine, when set on fire, does not burn the Hands, and tho’ pour’d on a Piece of red-hot Iron, does not take Fire; so that the *Fire* that is in should not appear very great, yet if it meet with some harder Body while it is burning, the Particles of which Body it is capable to agitate by the Attrition of its own, it will yield a fierce Flame capable of burning a harder Body than the Hand.

From this it appears, that the Relation of Heterogeneous Particles agitated by the *Fire*, has more effect in respect to Heat than the Action of the *Fire* it self: Nor need we be far to seek for the Mechanical Reason of this; for the Particles of *Fire* being all equal and spherical, must of themselves be harmless; but if they carry certain *Spicula*, or any other Bodies along with them, they then become capable of doing much Harm.

Hence, though the Flame of a Piece of Wood may give a Sense of Heat, and burn such things as are apply’d to it, it does not therefore necessarily follow that there is any pure *Fire* in it, so that the Distinction of pure and common *Fire* is absolutely necessary: Tho’ this Distinction has been overlook’d by most or all the Authors before Dr. *Boerhaave*, who have written on *Fire*, which has led them into egregious Mistakes, inasmuch, that most of them have held, that the Flame of a Piece of Wood is all *Fire*; which appears to be false from what has been already said, and also what follows.

Elementary or *pure Fire* is of it self imperceptible, and only discovers it self by certain Effects that it produces in Bodies; and these Effects are only to be learnt by the Changes which arise in Bodies: These Effects are three; 1st, *Heat*; 2dly, *Dilatation* in all solid Bodies, and *Rarefaction* in all Fluids; 3dly, *Motion*.

The first Effect of *Elementary Fire* on Bodies is *Heat*; *Heat* arises wholly from *Fire*, and in such a manner, that the Measure of *Heat* is always the Measure of *Fire*; and that of *Fire*,
 of

of Heat; so the Heat is inseparable from the Fire.

The second Effect of *Elementary Fire* is *Dilatation* in all solid Bodies, and *Rarefaction* in all Fluids.

Numerous Experiments make it evident, that both these are inseparable from Heat: If you heat an Iron Rod, it will increase in all its Dimensions, and the more it is heated, the farther it will be increas'd; and being again expos'd to the Cold, it will contract, and successively return through all Degrees of its Dilatation, till it arrives at its first Bulk, being never two Minutes successively of the same Magnitude.

The like may be observ'd in Gold, the heaviest of all Bodies, which takes up more Space when it is fus'd than it did before; nay, even Mercury, the heaviest of all Fluids, has been known to ascend to above thirty times its Height, being plac'd over the Fire in a narrow Tube.

The Laws of this Expansion are;

1st, That the same Degree of Fire rarefies Fluids sooner and in a greater Degree than it does Solids. Without this, the *Thermometer* would be of no Use; since if it were otherwise, the Cavity of the Tube would be dilated in the same Proportion as the Fluid is rarefied.

2dly, By how much the Liquid is lighter, by so much the more it is dilated by Fire: Thus Air, which is the lightest of all Fluids, expands the most; and Spirit of Wine the next after Air.

The third Effect of Fire on Bodies is *Motion*: For Fire, in warming and dilating Bodies, must necessarily move their Parts. And in effect, all the Motion in Nature arises from Fire alone; and if this were taken away, all things would become immoveable. All Oils, Fats, Waters, Wines, Ales, Spirits of Wine, Vegetables, Animals, &c. become hard, rigid, and inert upon the Absence of only a certain Degree of Fire; and this Induration will be both the sooner and the more violent, the less the Degree of Fire is.

Hence if the Fire were absolutely taken away, and there were the greatest Degree of Cold, all Nature would grow into one concrete Body, solid as Gold, and hard as a Diamond; but upon the Application of Fire, it would recover its former Mobility.

And of consequence, every Diminution of Fire is attended with a proportionable Diminution of Motion.

Pure Fire is found in two different Manners, either as it exists every where, and is diffus'd equally in all Places; or as it exists in certain Bodies, in which it makes no great Alteration.

That Fire should exist in the same Quantity in all Places, will seem a strange Paradox, and yet that it does so, is demonstrable from innumerable Experiments.

This *Elementary Fire* is present every where, in all Bodies, all Space, and at all Times, and that in equal Quantities; for let a Person go where he will, to the Top of the highest Mountains, or descend into the lowest Cavern,

whether the Sun shine or not; either in the most scorching Summer, or the sharpest Winter, Fire may be collected by several Methods, as Attrition, or otherwise. In a Word, there is no Physical Point assignable without Fire; no Place in Nature where the Attrition of two Sticks will not render it sensible.

The *Cartesians*, as *Mariotte*, *Perrault*, &c. hold, That there is a large Stock of Fire in a perfect Vacuum, i. e. a Space out of which all the Air has been exhausted, as supposing an absolute Vacuum impossible: Now the most perfect Vacuum that we can arrive at, is that of Mr. *Huygens's* Contrivance, which is as follows: Heat a Quantity of the purest Mercury to the Heat of boiling Water, and pour it into a hot Tube of about forty Inches long; and when the Tube is fill'd, apply a Finger upon the Orifice of it, and thus invert it into a Basin full of Mercury: The Mercury will now be suspended in the Tube to the whole Height; but then if you give it but a little Shake, it will sink down to the Height of about twenty-nine Inches, and thus leave a perfect Vacuity of eleven Inches.

Yet here the Philosophers above-mention'd deny there is any Vacuum, and urge, that now so much the more Fire is enter'd into the Space as there was of other Matter: But this is contrary to Experience, at least, the Fire contain'd there is no hotter than the Mercury it self; for if a Drop or two of Water be in a frosty Season sprinkled both upon the upper Part of the Tube, suppos'd to be full of Fire, and on the lower that is full of Mercury, they will in each Place freeze alike; so that there is no more pure Fire in a perfect Vacuum than in any other Place.

But whereas it has been said, that Fire is found in all Bodies: To prove this, let Gold against the Vacuum before mention'd, and this Gold, tho' the most ponderous of all Bodies, will not contain more Fire than *Huygens's* Vacuum, as appears from the *Thermometer*.

But the Fire in Gold, when ready to fuse, is pure Fire; for a Mass of this being once heated red hot, will retain this Fire perfectly for three Days: Nay, the Prince of *Mirandula* and others have kept Gold ignited for two Months without any Diminution of Weight.

Mr. *Gravesande*, *Phys. Element.* says, That Bodies of any Kind being violently mov'd against one another, will grow hot by such Friction, and this to a considerable Degree, which shews that all Bodies have Fire in them: For Fire may be put in Motion, and separated from a Body by such rubbing, but can never be generated that Way.

Mr. *Boyle*, *Mech. Prod. of Heat*, says, That whereas Quicksilver is allow'd to be the coldest of all Fluids, insomuch that many deny that it will produce any Heat by its immediate Action on any other Body, and particularly on Gold; but several Trials have assured me, that a particular Mercury may by Preparation be enabled suddenly to insinuate it self into the Body of Gold, whether calcin'd or crude, and become manifestly hot with it in less than two or three Minutes.

Mr. *Grave-*

Mr. *Gravesande* says, That Quicksilver contains *Fire*, is evident hence, that if you shake it about in an exhausted Glass, it will appear all luminous.

Elementary Fire of it self always lies conceal'd, nay, it may be perfectly undiscoverable, where it is in the greatest Quantity, as is evident in the *Torrid Zone*, where the Snow never melts, notwithstanding the great Abundance of *Fire*.

This *Fire*, in it self thus perfectly latent, may discover it self to be present by five Effects; 1st, by rarefying Bodies, and particularly Air; 2dly, by Light; 3dly, by Colour; 4thly, by Heat; and 5thly, by Burning.

That there is a good Quantity of *Fire* even in the coldest Places, and in the coldest Bodies, is confirm'd by the following Experiment: If you take two large Iron Planes, and rub them briskly together in *Iceland*, which is only twelve Degrees short of the North-Pole, in the most frosty Season, and at Midnight, they will grow warm, glow, shine, and heat to such a Pitch, as not only to rarefy the Spirit in the *Thermometer*, but even to ignite, and at last to fuse.

Now the *Fire* here found is either created *de novo*, or it was there before; but no body will assert its Creation, and accordingly, unless it be furnish'd with a proper Fuel, it will be soon dissipated again, but not annihilated, and of consequence it pre-existed, and it appears to be true *Fire* by its rarefying the Spirit in the *Thermometer*.

From this, and many other Experiments, it is evident, that *Fire* is always found in all Parts of Space, and in all Bodies equally spread on the utmost Top of the highest Mountain, as in the subject Valley, or in the deepest Cavern under-ground, and in every Climate, and at every Season.

The equable Distribution of *Fire* in all Places being prov'd, it should thence follow, that there is the same Degree thereof every where; which would really be so, were it not that *Fire* happens by one Means or other to be more collected in one Place than another.

But, notwithstanding, the equable Difference, &c. of *Fire* through all the Mundane Space, does not hinder, but that, to our Senses, it appears very unequal in different Places: And hence we have two vulgarly reputed Sources or Funds of *Fire*, viz. in the Sun, and the Centre of the Earth.

As for the first, we have the concurrent Opinions of the Philosophers of all Ages, but one excepted, who held the Sun to be cold.

As to the second, the *Central Fire*; it is manifest that there is an ample Proportion of *Fire* under-ground; and even, that *Fire* appears much more abundant there than on the Surface; so that at least, a *subterraneous Fire* must be granted.

Thus they who dig Mines, Wells, &c. constantly observe, that while they are but a little below the Surface, they find it a little cool, and as they proceed lower it proves much colder, as being then beyond the Reach of the

Sun's Heat, insomuch that Water will freeze almost instantaneously; and hence is the Use of Ice-houses.

But a little lower, about forty or fifty Feet deep, it begins to grow warmer, so that no Ice can bear it; and then the deeper they go still the greater the Heat; till at length it endangers the Stoppage of Respiration, and puts out their Candles: If they venture yet farther with a lighted Candle, the Place shall be immediately found full of Flame, as once happen'd in the Coal-Pits in *Scotland*, where an hardy Digger descending to an unusual Depth with a Light in his Hand, the Fumes, which were there found very copious, caught *Fire* thereby, and burnt the whole Mountain down.

Therefore it seems as if Nature had lodg'd another Sun in the Center of the Earth, to contribute on its Part to the giving of Motion to Bodies, and for the promoting of Generation, Nutrition, Vegetation, Germination, &c. of Animals, Vegetables and Fossils.

As to the Origin of this subterraneous Sun, some doubt whether it were form'd there in the Beginning, like the Sun in the Firmament, or gradually produc'd by a secondary Collection of vague *Fire* into this Place.

What makes in Favour of the former Opinion, are *Vulcano's* or burning Mountains, which seem to have existed from the first Ages; for the Flames of Mount *Aetna* are mention'd as of great Antiquity; and there are likewise such Mountains found in the coldest Regions, viz. *Nova Zembla*, and *Iceland*, as well as the hottest, as *Borneo*, &c.

It cannot be reasonably pretended, says Mr. *Boyle*, that the subterraneous Heat proceeds from the Rays of the Sun, since they heat not the Earth above six or seven Feet deep, even in the Southern Countries; and if the lower Part of the Earth were of its own Nature cold, and receiv'd the Heat it affords only from the Sun and Stars, the deeper Men descend therein, the less Degree of Heat and Steams they would meet with.

The Sun contributes much in bringing *Fire* to light, by Means of his rapid Motion round his Axis, whereby the fiery Particles, every where diffus'd, are directed and determin'd in parallel Lines towards certain Places where its Effects become apparent.

And from thence it is that the *Fire* is perceiv'd by us when the Sun is above; but that when he disappears, his Impulse or Pressure being then taken away, the *Fire* continues dispers'd at large through the *Etherial Space*.

There is not in effect less *Fire* in our Hemisphere in the Night-time than there is in the Day-time, only it wants the proper Determination to cause it to be perceiv'd.

The Effects of *Elemental Fire* may be increas'd divers Ways, viz. first, by *Attrition*, or a swift rubbing or agitating one Body against another. This is very manifest in Solids: The *Attrition* of a Flint against a Steel produces Sparks of *Fire*: And likewise in Fluids, the violent Agitation of Cream by churning

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will

will produce a sensible Warmth, and separate it into Butter, and this Effect is render'd still more discernable by a Barometer.

And the Heat of Animal Bodies is owing to the Agitation and Attrition of the Parts of these Juices against each other, and the Sides of the Vessels.

The second Manner of increasing the Effect of *Elementary Fire*, is by throwing a Quantity of moist or green Vegetables, cut down while full of Sap, into a large Heap, and pressing them close down; by which they grow warm, hot, smok, and break out into Flame.

A third Way, is by mixing certain cold Bodies: Thus Water and Spirit of Wine being first warm'd, grow much hotter by being mixed; also Oil of Cloves, Cinnamon, &c. being mix'd with Spirit of Wine, become exceeding hot, and burst forth like Vulcano's.

The like Effects may be had from several hard and dry Bodies, as Sulphur and Steel-filings.

To conclude: Of *Fire*, and the Effects thereof depend all Fluidity of Humours, Juices, &c. all Vegetation, Putrefaction, Fermentation, Animal Heat, &c.

As all the four Elements, *Water, Air, Earth* and *Fire*, are very conducive to the Work of Vegetation, and no one of them more than this of *Fire*; I conclude, that these few Hints, which I have collected from the most approv'd Authors, concerning the Nature and Properties of it, as they may be useful, would not be unacceptable to the ingenious and studious Practicers of *Horticulture*, which induced me to insert them here. See the Article *Heat*.

FIR-TREE; *vide* Abies.

FISTULAR FLOWERS, [*Flores Fistulares*, or *Fistula*, Lat. a *Pipe*] such as are compounded of many long, hollow, small Flowers like Pipes.

FLAMMULA JOVIS; *vide* Clematis

FLESH, (among *Botanists*) is all the Substance of any Fruit that is between the Outer Rind and the Stone, or that Part of any Root that is fit to be eaten.

FLORIFEROUS, [*Florifer*, Lat.] Bearing Flowers.

FLORIST, One who is conversant with, or skill'd in Flowers.

FLORULENT, FLORULOUS, [*Florulentus*, *Florulus*, Lat.] Flowery, full of Flowers; also Blossoming.

FLOS AFRICANUS; *vide* Tagetes.

FLOS PASSIONIS; *vide* Granadilla.

FLOS SOLIS; *vide* Corona Solis.

FLOS TRINITATIS; *vide* Viola.

FLOWER: A *Flower* is a natural Production which precedes the Fruit, and yields the Grain or Seed. Tho' a *Flower* is a Thing so well known, yet the Definition of this Part

of a Plant is as various almost as the Authors who define it. *Jungius* defines it to be the more tender Part of a Plant, remarkable for its Colour or Form, or both, cohering with the Fruit: yet this Author himself confesses that this Definition is too narrow; for some of those Bodies which he allows to be Flowers, are remote from the Fruit.

Mr. Ray says it coheres, for the most part, with the Rudiments of the Fruit. Thus the Words for the most part, are hardly to be admitted into Definitions.

Tournefort defines it to be a Part of a Plant, very often remarkable for its peculiar Colours, for the most part adhering to the young Fruit, to which it seems to afford the first Nourishment, in order to explicate its most tender Parts. Which Definition is still more deficient than the preceding, by this uncertain Mode of Expression.

Ponteder Professor of Botany at Padua, defines it to be a Part of a Plant, unlike the rest in Form and Nature, always, when the Flower has a Tube, adhering or fixed very near to the Embryon, to the Use of which it is subservient; but if the Flower has no Tube, not adhering to the Embryon. Which Definition is not much clearer, being scarce intelligible to any Person who has not studied Botany a considerable Time; as Mr. John Martyn well observes, and also that it is liable to this Objection, That it may include some Parts, which no Person ever call'd by the Name. For a Root, or a Stalk, or a Leaf, are Parts of a Plant unlike the rest in Form and Nature, having no Tube, and so adhering to no Embryons; and thus, by *Ponteder*'s Definition, are Flowers.

Monf. *Jussieu*, the Paris Professor, seems not to have succeeded much better in this Affair: he says, that it is properly call'd a Flower which is compos'd of Chives and a Pistillum, and is of Use in Generation. But this too is defective; for that there are many Plants in which the Pistillum or Stile is found a considerable Distance from the Chives: many Flowers that have no Pistillum, whether that Word be taken to signify the Embryon of the Fruit, or its Appendix: and many which have no Chives.

But the late Monf. *Vaillant* seems to be happier, in forming a clearer Idea of this Part of a Plant. We find in the Lecture he read in the Royal Garden at Paris, that the Flowers, strictly speaking, ought to be reckon'd the Organs which constitute the different Sexes in Plants, seeing they are sometimes found without any Covering, and that the Coats or Petals, which immediately encompass them, are design'd only to cover and defend them: But (says he) as these Coats are the most conspicuous and most beautiful Part of the Composition, which is call'd by the Name of Flower, to these Coats therefore I give the Name of Flower, of whatsoever Structure or Colour they be, whether they encompass the Organs of both Sexes together, or contain only one of them, or only some Parts depending on one of them, provided

vided always that they be not of the same Figure of the Leaves of the Plant.

But, in my Opinion, Mr. *John Martyn* has been happier in his Definition of a *Flower*, than all those above mention'd: He defines a *Flower* to be the *Organs of Generation of both Sexes adhering to a common Placenta*, together with their common Coverings; or of either Sex separately, with its proper Coverings, if it have any.

The Parts of a *Flower* are, 1. the *Ovary*, which is the Rudiment of the Fruit, and so is properly the Female Organ of Generation.

2. The *Stile*, which is a Body accompanying the *Ovary*, either arising from the Top of it, or standing as an *Axis* in the Middle, with the Embryons of the Seeds round it.

3. The *Summits* or *Apices*, which are those Bodies that contain the Prolifick Powder, analogous to the Male *Sperm* in Animals; and generally hang upon slender Threads, which are call'd the *Chives*.

The *Petals* are those tender, fine-colour'd Leaves which are generally the most conspicuous Parts of a *Flower*.

The *Empalement* or *Calix* is those tender Leaves which cover the other Parts of a *Flower*.

Flowers, according to the Number of their *Petals*, are call'd Monopetalous, Dipetalous, Tripetalous, Tetrapetalous, &c.

The Structure of *Flowers* is indeed very various: but according to Dr. *Grew*, the Generality have these three Parts in common, viz. the *Empalement*, the *Foliation*, and the *Attire*.

Mr. *Ray* reckons that every perfect *Flower* has the *Petala*, *Stamina*, *Apices*, and *Stylus* or *Pistil*; and such as want any of these Parts, he accounts imperfect *Flowers*.

In most Plants there is a *Perianthum*, *Calix* or *Flower-Cup*, which is of a stronger Consistence than the *Flower* it self, and design'd to strengthen or preserve it.

Flowers are distinguish'd into *Male*, *Female* or *Hermaphrodite*.

The *Male Flowers* are those in which are the *Stamina*, but bear no Fruit; the same which *Botanists* call *Staminate Flowers*.

The *Female Flowers* are such as contain the *Pistil*, which is succeeded with Fruit, and are call'd *Fruitful* or *Knitting Flowers*.

The *Hermaphrodite Flowers* are such in which the two Sexes are contained, i. e. the Male and Female Parts are found in the same *Flower*, which are the most general Kind; such are the *Daffodil*, *Lily*, *Tulip*, *Alibæa*, *Geranium*, *Rosemary*, *Sage*, *Thyme*.

The Structure of Parts is much the same in those where the Sexes are divided; the Difference between them consisting in this, that the *Stamina* and *Apices*, i. e. the Male Parts in these are separate from the *Pistils*, being sometimes on the same Plants, and sometimes on different ones.

Among the Plants which bear both Male and Female Parts, but at a Distance from each other, are reckon'd the *Cucumber*, *Melon*, *Gourd*, *Turkey Wheat*, *Turnsol*, *Wall-nut*, *Oak*, *Beech*, &c.

FLOWERAGE: The setting of several Sorts of *Flowers* together in Husks, and hanging them up in Strings.

FLUIDITY, [*Fluiditas*, of *fluere*, Lat. to flow.] Having Occasion to mention *Fluids* and *Fluidity*, in speaking of the Properties of the Elements *Air*, *Water*, *Fire*, &c. I thought necessary, in this Place, to give the following Account of that Property, which I have extracted from the most approv'd Authors.

A *Fluid* or *Fluid Body*, is by some defin'd to be a Body whose Particles are but weakly connected, their mutual Cohesion being in a great measure prevented from some external Cause: In which Sense a *Fluid* stands oppos'd to a *Solid*; and is by the excellent Sir *Isaac Newton* defin'd to be one whose Parts easily give Place, or move out of the Way, on any Force impell'd upon them, and by that means do so easily move one over another. Which Definition is much better than that of *Des Cartes*, That a *Fluid* is a Body whose Parts are in continual Motion: because 'tis neither apparent, that the Parts of all *Fluids* are so; nor, that the Parts of some *Solid Bodies* are not so.

Fluidity is the State or Affection of Bodies, which denominates or renders them *fluid*, and stands in direct Opposition to *Firmness* and *Solidity*.

It is distinguish'd from *Liquidity* and *Humidity*, in that the Idea of *Fluidity* is absolute, and the Property contain'd within the Thing it self: whereas that of *Humidity* is relative, and implies Wetting, or Adhering, i. e. something that gives us the Sensation of Wetness or Moisture, and would have no Existence, but for our Senses.

Thus melted Metals, *Air*, *Æther*, and even *Smoak*, and *Flame* it self, are *Fluid Bodies*, and not *Liquid* ones; the Parts of them being actually dry, and not leaving any Sense of Moisture. See *Liquidity* and *Humidity*.

Fluidity seems to consist in this, That the Parts of any Bodies being fine and small, are so dispos'd by Motion and Figure, as that they can easily slide over one another's Surfaces all manner of Ways. Mr. *Boyle* also observes, That it is requisite they should be variously and separately agitated to and fro, and that they should touch one another but in some Parts only of their Surfaces. And the same Gentleman says, in his *History of Fluidity*, That the Conditions requisite to constitute a *Fluid Body*, are chiefly the three following:

1st, The *Minuteness* or *Smallness* of its Parts: Thus we see the *Fire* by dividing Metals into Parts very fine and small, will melt them, and make them fluid. And after the same manner do acid *Menstruums* dissolve them, suspend their *Liquor*, and render them fluid. And that *Fire* turns the hard Body of common *Salt* almost wholly into a *Liquor*, by *Distillation*: tho' 'tis not improbable but that the Shape and Figure of these small Parts may conduce much towards producing this Quality of *Fluidity*;

for

for it is found in the Distillation of *Olive Oil*, (which is a Fluid made only by Pressure) that most of the Oil will, by the Action of the Parts of the Fire (if it be done in a Retort) be turn'd into a kind of consistent Substance like Butter.

Likewise *Mercury*, whose Parts are without doubt much grosser than those of Oil and Water, is yet more fluid than either of them.

2dly, It seems requisite to *Fluidity* that there be Store of Vacuities, or vacant Spaces interspers'd between the Corpuscles of the fluid Body, for else there will not be Room for each Particle to continue its Motion and Agitation on the Surfaces of the neighbouring ones. For,

3dly, The chief Condition requisite to constitute a fluid Body is, that its Particles be agitated variously and apart, either by their own proper Motion, or by something of Substance that tumbles them up and down by its Passage through them.

That this Qualification is chiefly requisite to *Fluidity*, you may gather from that common Experiment of putting a little dry Powder of *Alabaſter*, or Plaster of *Paris* finely sifted in a flat-bottom'd Vessel over the Fire, for in a little time it will boil like Water, and imitate all the Motions of a boiling Liquor; it will tumble variously over in great Waves like that; it will bear stirring with a Stick or Ladle without resisting, as it will do when cold; nay, if it be stirr'd strongly near the Side of the Vessel, its Waves will apparently dash up against the Sides; yet if any of it be speedily taken out, and laid on a Piece of Paper, you will see nothing but a dry Powder.

So that it is evident from hence, that there is a real Difference between a *fluid Body* and a *wetting Liquor*; for not only this boiling Powder and melted Metals, but the *Air* and *Ether*, and even Flame itself are properly fluid Bodies, tho' not moist Liquors.

This ingenious Gentleman found also, that by blowing the Smoke of *Rosemary* into a Glass Pipe, and then holding the Pipe (when fill'd) upright, the Surface of the Smoke would accommodate its self to a level Situation; and which Way soever the Tube was inclin'd, the Superficies of the Smoke would be parallel to the Horizon; and when the Glass was much inclin'd, would run along it like Water.

From whence he infers, that in order to the rendring a Body fluid, there is no need that its Parts should be closely condens'd as those of Water are.

And Dr. Hook, in his *Micograph*. p. 12. presents us with a very pretty Experiment or two to prove this Account of *Fluidity*, viz. That a Dish of Sand being set on a Drum-head, briskly beaten by the Sticks; or on the upper Stone of a Mill, turning swiftly round on the (empty) lower one, it in all respects emulates the Properties of a fluid Body; for a heavy Body will immediately sink in it to the Bottom, and a light one emerge to the Top; each Grain of Sand hath a constant vibrating, dancing Motion; and if a Hole be made in the Side of the Dish, the Sand will spin out like Water.

The Corpuscular Philosophy, before it was wonderfully improv'd by Sir *Isaac Newton*, did not go to the Bottom of this Matter, for it gave no Account of the Cause of the chief Condition requisite to constitute a fluid Body, viz. the various Motions and Agitations of its Particles: But this may in a great measure be accounted for, if it be suppos'd to be one of the primary Laws of Nature; that as all Particles of Matter do attract one another, when they come within a certain Distance, so likewise they do fly away from and avoid one another, at all greater Distances from one another.

For then tho' their common Gravity may keep them together in a Mass (it may sometimes be) together with the Pressure of other Bodies upon them, yet their continual Endeavours to avoid one another singly, and the adventitious Impulses of Light, Heat, or other external Causes, may make the Particles of Fluids continually move round about one another, and so produce this Quality.

It is, indeed, a Difficulty not easily got over, to account for the Particles of Fluids always keeping at such a Distance from one another, as not to come within the Sphere of one another's Attraction.

The Fabrick and Constitution of that fluid Body, Water, is amazing; that a Body so very rare, and which has a vast Over-proportion of Pores, or interspers'd Vacuity to solid Matter, should yet be perfectly incompressible by the greatest Force, and yet this Fluid is easily reducible into that firm, transparent, friable Body, which we call Ice, by being only expos'd to a certain Degree of Cold.

One would think, that tho' the Particles of Water cannot come near enough to attract each other, yet the intervening frigorifick Matter doth, by being mingled *per minima*, strongly attract them, and is it self likewise strongly attracted by them, and so wedges or fixes all the Mass into a firm Body; which solid Body loses its Solidity again, when by Heat the Vintum is solved, and these frigorifick Particles are disjoin'd from those of the Water, and are forc'd to fly out of it; and, perhaps, just thus may the Fumes of Lead fix Quicksilver.

When a firm solid Body, such as a Metal, is by Heat reduc'd into a Fluid, doth not the Fire disjoin and separate its constituent Particles, which mutual Attraction caus'd to cohere before, and keep them such a Distance from each other, as that they are without the Sphere of one another's Attraction as long as that violent Motion lasts? And don't they, when that is over, and the Heat is flown out, come nearer to, attract one another, and coalesce again?

As therefore the Cause of Cohesion of the Parts of solid Bodies appears to be their mutual Attraction, so the chief Cause of *Fluidity* seems to be a contrary Motion impress'd on the Particles of Fluids, by which they avoid and fly one another, as soon as they come at, and as long as they keep at such a Distance from each other.

It

It is observ'd also in Fluids, that the Direction of their Pressure against the Vessels which contain them, is in Lines perpendicular to the Sides of such Vessels; which Property being the necessary Result of the Particles of any Fluids being spherical, it shews that the Parts of all Fluids are so, or of a Figure nearly approaching thereto.

Dr. Clark says, That if the Parts of a Body do not touch each other, or easily slide over one another, and are of such a Magnitude as that they may be easily agitated by Heat, and the Heat be sufficiently great to agitate them; though perhaps it may be less than suffices to prevent Water from freezing; or even though the Parts be not actually mov'd, yet if they be small, smooth, slippery, and of such a Figure and Magnitude, as disposes them to move and give Way, that Body is fluid:

And yet the Particles of such fluid Bodies, do in some measure cohere; as is evident hence, that *Mercury*, when well purg'd of Air, will be sustain'd in the *Barometer* to the Height of sixty or seventy Inches; that Water will ascend in capillary Tubes, even in *vacuo*; and that the Drops of Liquors in *vacuo* run into a spherical Form, as adhering by some mutual Cohesion, like that between polish'd Marble Planes.

To this may be added, That these fluid Bodies, if they consist of Particles, which are easily entangled with each other, as *Oil*; or if they be capable of being stiffened by Cold, and joined by the Interposition of certain *Cunei* or Wedges, as *Water*, they are easily render'd hard: but if their Particles are such as can neither be entangled, as Air, nor stiffen'd by Cold, as *Quicksilver*, then they never grow hard and fix'd.

In short, the *Cartesians* define a Fluid to be a Body, the Parts of which are in continual intestine Motion; and Dr. Hook, Mr. Boyle, and Dr. Boerhaave, tho' they differ in Opinion widely from *Cartesianism*, subscribe to the Definition, and alledge Arguments to prove that the Parts of Fluids are in continual Motion; and even that it is this Motion which constitutes *Fluidity*: and the latter of them ascribes this and all Motion to Fire. See *Fire*.

Fluids then are either natural, as *Water*, and *Mercury*; or animal, as *Blood*, *Milk*, *Bile*, *Lympha*, *Urine*, &c. or facitious, as *Wines*, *Spirits*, *Oils*, &c.

FOENICULUM; [This Plant seems to take its Name of *Fenum*, Lat. *Hay*, q. d. *small* or *fine Hay*; but some derive it from *Venus*, because this Plant sows it self among others, and becomes fruitful, or because it provokes the *Semen* in Men.] *Fennel*.

The Characters are;

It is an *Umbelliferous* Plant, whose Leaves are divided into *Capillaceous* Fags: The Petals of the Flower are intire, and plac'd orbicularly, expanding in form of a *Rose*: Each Flower is succeeded by two oblong, thick, gibbous Seeds, which are channel'd on one Side, and plain on the other.

The Species are;

1. **FOENICULUM**; *vulgare, Germanicum*. C. B. Common Fennel.

2. **FOENICULUM**; *foliis atrovirentibus*, H. Edin: Common Fennel, with Dark-green Leaves.

3. **FOENICULUM**; *dulce* C. B. Sweet Fennel.

4. **FOENICULUM**; *sylvestre*. C. B. Wild Fennel.

5. An **FOENICULUM**; *vulgare, Italicum, semine oblongo, gusto, acuto*. C. B. *Finochia*; *vulgò*.

The first Sort is so common in *England*, that it will be needless to say any thing concerning it.

The second Sort is a Variety of the first, which is very common amongst it in most Gardens in *England*.

The third Sort is the *Sweet Fennel*, whose Seeds are us'd in Medicine: This is by many People suppos'd to be only a Variety of the common Sort, or at least that the common Sort is a Degeneracy from it; but this is a great Mistake, for the *Sweet Fennel* is an annual Plant, and never survives a Winter with us, whereas the common Sort will abide many Years.

The first and second Sorts are promiscuously brought to the Markets for Kitchen Uses. These are propagated by sowing their Seeds soon after they are ripe; and when the Plants are come up, they should be either transplanted, or hoed out to the Distance of sixteen or eighteen Inches, Plant from Plant, for they will spread and increase in Bulk greatly: Their Roots will abide many Years, but you must be careful not to suffer their Seeds to shed upon the Ground, for the Plants will come up and over-run every thing that grows near them, and they are with much Difficulty extirpated.

The *Sweet Fennel* is an Annual, and must be sown upon a warm Soil, and in an open Situation in *February* or the Beginning of *March*; and when these Plants are come up, they should be hoed out to ten Inches or a Foot Distance from each other, and kept clear from Weeds: In *August* this Plant will perfect its Seeds, and soon after the Roots will decay. The Seeds of this Plant which are sav'd in *England*, are not near so good as those which are brought from Abroad, which are generally imported at a very reasonable Price, so that it is not worth cultivating with us.

The *Finochia* is a Plant which of late Years has been introduc'd into the *English* Gardens, where it is cultivated as a Salad-herb, and is by some People very much esteem'd, tho' the Generality of *English* Palates do not at present relish it; but since it is likely to become of more general Use, I shall give a short Account of its Culture.

First, you must provide your self with a Parcel of good Seeds from *Italy*, for those sav'd in *England* are very apt to degenerate: In *February* you may sow some for the first Crop, which should be in a warm Situation, and upon a light dry Soil. The manner of doing this is as follows: After having well dug and

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levell'd

levell'd the Ground smooth, you should make a shallow Rill by a Line, into which you must scatter your Seeds pretty thin; for if your Plants are six Inches asunder in the Rows, it will be full near enough; but however, you must expect some of your Seeds to fail; and therefore you should scatter them about two Inches Distance; then cover the Seeds about half an Inch thick with Earth, laying it smooth: These Rills should be made sixteen Inches asunder, or more, that there may be Room to clear the Ground, as also to earth up the Plants when they are full grown. When the Plants come up, which will be in about three Weeks or a Month after sowing, you must with a small Hoe cut up all the Weeds between them, and cut out the Plants to about four Inches Distance; and as they advance, and the Weeds spring again, so they should, from Time to Time, be hoe'd: And at the last Time of thinning them, they should be left six or seven Inches asunder at least. If your Kind be good, the Stems of the Plants will increase to a considerable Bulk just above the Surface of the Ground, which Part should be earth'd up in the manner of *Celery*, to blanch about a Fortnight before it is us'd, and this will cause it to be very tender and crisp.

Your second Crop should be sown about three Weeks after the first, and so continue sowing every three Weeks or a Month 'till July; after which Time it will be too late for the Plants to come to any Perfection. But you should observe to sow in April and May on a moister Soil than that which you sow'd the first on: As also what you sow in the latter part of June, or the Beginning of July, should be sown on a drier Soil, and in a warmer Situation; because this Crop will not be fit for Use 'till late in the Autumn, and therefore will be subject to Injuries from too much wet or cold Weather, if on a moist Soil. But as the Ground is very often extreme dry in June and July, and so the Seeds are more apt to miscarry, or not to come up, you should therefore observe to water and shade the Beds where this Seed is sown at that Season until the Plants come up.

A small Bed of this Plant will be sufficient at each Sowing for a middling Family; and for a large Family, a Bed of about twenty Feet long and four Feet broad will be full enough at a time.

FOENUM BURGUNDIACUM; *vide Medica Sativa.*

FOENUM GRÆCUM, [*Grecian Hay*, is so call'd, because being dry'd, it looks like Hay, and the Seeds were brought from Greece. It is also call'd *Buceras*, from *Būs* an Ox, and *Kēgas* a Horn, q. d. Ox-Horn, from the Shape of the Husk; also *Ægoceras*, of *Αἴξ* *regyō*, a Goat, and *Kēgas* a Horn, q. d. Goat's-Horn, from the same Cause.] Fenugreek.

The Characters are;

It hath a papilionaceous Flower, out of whose Impalement rises the Pointal, which after-

wards becomes a Pod somewhat plain, shap'd like a Horn, and full of Seeds, for the most part Rhomboid or Kidney-shap'd.

The Species are;

1. **FOENUM GRÆCUM;** *sativum.* C. B. Common Fenugreek.

2. **FOENUM GRÆCUM;** *sylvestre* C. B. Wild Fenugreek.

3. **FOENUM GRÆCUM;** *sylvestre, alterum polyceration.* C. B. Another wild Fenugreek with many Pods.

There are several other Varieties of this Plant, which are preserv'd in curious Botanick Gardens: but as they are Plants of little Use or Beauty, so I shall omit mentioning them here.

The first Sort here mention'd, is that of which the Seeds are us'd in Medicine.

The other two Sorts are Varieties which are preserv'd in some Gardens. They may be propagated by sowing their Seeds in February or March upon a light Soil, and in an open Exposure. The Plants, when they come up, should be singled out to about four or five Inches Distance each way: And the Ground should be constantly kept clear from Weeds, which, if suffer'd to grow, would soon overspread and destroy the Plants: But you must observe, these Plants will not bear transplanting, therefore they should be sown in the Places where they are to remain. In June they will flower, and their Seeds will be perfected in August.

This Plant is cultivated in the open Fields in the South Parts of France and Italy, from whence the Seed is brought to England for Use; for it is too uncertain a Crop to cultivate here, being very apt to miscarry in cold wet Summers.

FOLIATION is one of the Parts of a Flower of a Plant, being a Collection of those fine-colour'd Leaves which constitute the Compaſs of the Flower.

FOOT-HUSKS are short Heads out of which Flowers grow.

FOUNTAINS are Sources or Springs of living Water arising out of the Ground. As to the Original of them, see under the Article *Springs*.

Of Artificial Fountains there is a great Variety; the Mechanism of which not being to my Purpose, I will not dwell upon it: Tho' I may assert, that they are not only great Ornaments to a fine Garden, but also of great Use. But they ought not to be plac'd too near the House, by reason of the Vapours that arise from the Water, which may be apt to strike a Damp to the Walls, and spoil the Paintings, &c. and the Summer Vapours may cause a Malignity in the Air, and so be prejudicial to the Health of the Family; and likewise the Noise may be incommodious in the Night.

Fountains in a Garden should be so distributed, that they may be seen almost all at one Time, and that the Water-spouts may range

range all in a Line one with another; which is the Beauty of them; for this occasions an agreeable Confusion to the Eye, making them appear to be more in Number than really they are. See *Jet d'Eau, Springs, Vapours, Water, &c.*

FRAGARIA; [is so call'd for its fragrant, aromattick Scent.] Strawberry.

The Characters are;

It hath a perennial fibrose Root: The Leaves are vein'd, growing upon each Foot-Stalk: The Stalks trail upon the Ground: The Cup of the Flower consists of one Leaf, which is divided into ten equal Parts, and expands in Form of a Star: The Flower consists for the most part of five Leaves, which expand in Form of a Rose, and have many Stamina in the Middle, round the Base of the Ovary: The Fruit is globose or oval, and consists of a fleshy, eatable Pulp, full of Protuberances.

The Species are;

1. **FRAGARIA**; *vulgaris* C. B. Common or Wood-Strawberry.

2. **FRAGARIA**, *fructu albo*. C. B. Common Strawberry, with white Fruit.

3. **FRAGARIA**; *fructu parvi pruni magnitudine*. C. B. The Haut-boy Strawberry; *vulgò*.

4. **FRAGARIA**; *Virginiana, fructu coccineo*. M. H. Virginian Strawberry, with Scarlet Fruit.

5. **FRAGARIA**; *Chilensis, fructu maximo, foliis carnosis hirsutis; vulgò frutilla*. Frez. Voy. Large Chili Strawberry.

The first and second Sorts of Strawberry are found wild in the Woods in divers Parts of England, from whence the Plants are taken and transplanted into Gardens, by which the Fruit is improv'd. The best Season for this Work is in September, that the Plants may be rooted in their new Quarters before the Frost begins, which is very apt to loosen the Earth so much about their Roots, that when the Frost goes off, the Plants are apt to be turn'd out of the Ground. They may also be transplanted in February; but then if the Spring should prove dry, they will require a great Expence of Water to preserve them alive.

The Soil which is most proper for these Plants, is a fresh hazily Loam, not over-rich, which would cause the Plants to spread and flourish, but they would not be so fruitful as upon a moderate Soil. The Ground should be well dug, and clear'd from the Roots of all noxious Weeds; and after it is level'd even, you must mark it out into Beds about three Feet and a half wide, leaving a Path between each Bed two Feet broad, for the Convenience of walking between them to water and clean them, as also to gather the Fruit. In these Beds may be planted four Rows of Plants, whereby they will be about a Foot asunder Row from Row; and in the Rows they should be planted at least eight Inches distant Plant from Plant; for if they are planted nearer, they will in one Year's Time be so thick, that they will not have Room to thrive. Note,

the Distance here assign'd, being for the Wood-Strawberry, which is of the least Growth, the other large growing Kinds must have a greater Share of Room, according to their different Degrees of Growth; as for Example, the Scarlet Strawberry should be planted a Foot square Plant from Plant, and the Hautboy sixteen or eighteen Inches Distance each Way, and the Chili Strawberry twenty Inches or two Feet.

In the Spring of the Year, when the Strawberries begin to flower, if the Season be dry, you must observe to water them plentifully, otherwise the Flowers will fall away without producing any Fruit. You must also carefully clean your Beds of Strawberries from Weeds from time to time, as they shall require; for if they are once suffer'd to over-bear the Plants, they will decay in large Patches, and also greatly weaken all those that may continue alive. About Michaelmas you should clear off all the Weeds from the Beds, as also cut off all the Strings or Runners from the Roots, pulling out all weak Plants where they are too close; then dig up the Walks between the Beds, burying the Seeds that came off in the Bottom, and throw a little fine Earth over the Beds between the Plants, being very careful not to lay it so thick as to bury the Plants: This will greatly strengthen them, and cause their Fruit to be larger and in greater Quantities than they would be if left undress'd.

These few Rules will be sufficient, if duly observ'd, for cultivating these Plants. I would only farther observe, that these Beds will not continue bearing well more than three Years, therefore in order to have a constant Supply, you should plant a fresh Plat of Ground a Year before you destroy the old Beds, otherwise (your young Plantation producing few or no Fruit the first Year) you will be destitute a whole Season.

The Wood Strawberry is by many People prefer'd for the Firmness of its Fruit and Delicacy of Flavour: Others greatly admire the Scarlet Sort for its Goodness, and the Haut-boy is esteem'd for the Largeness of its Fruit. The Chili Strawberry was brought first into Europe by Monsieur Frezier, Engineer to the late French King, and given to Monsieur de Jussieu, Professor of Botany to the Royal Garden at Paris, who hath spread it into divers Parts of Europe. This Plant Monsieur Frezier says, is cultivated in the Fields near Chili in great Plenty, and that it differs from the European Kinds, in having larger, thicker, and more hairy Leaves: The Fruit is generally as large as a Walnut, and sometimes, as big as an Hen-Egg, of a whitish red Colour, and somewhat less delicious in Taste than our Wood Strawberries. This has produc'd Fruit several Years in the Royal Garden at Paris, where Monsieur Jussieu assur'd me, it was commonly as large as a small Apple. I brought some of the Plants from Holland Anno 1727, which thrive and increase exceedingly, but as yet I have obtain'd no Fruit; tho' the last Season, Anno 1729, they produc'd great Numbers of Flowers,

Flowers, which were larger than the *Hautboy-Strawberry*, in proportion to the Bulk of its Fruit: and this Season there has been Fruit in several Gardens near London. I observe they thrive best where they have only the Morning Sun, and do require frequent Waterings in dry Weather.

FRANGULA; [is so call'd of *frangendo*, breaking, because of the Brittleness of its Wood.] Berry-bearing Alder.

The Characters are;

It hath roundish Leaves somewhat like those of the Alder-Tree, but smaller: The Flower consists of five Leaves, which expand in form of a Rose: The Flowers are succeeded by small round Berries, in each of which is contain'd two small flat Seeds.

We have but one Species of this Plant, which is,

FRANGULA; five *Alnus*, *nigra*, *baccifera*. Park. Theat. Black Berry-bearing Alder.

This Tree is very common in moist Woods in divers Parts of England, and is rarely cultivated in Gardens, except for Variety: It seldom grows above fourteen or sixteen Feet in Height, and is not very regular in its Growth, so that as it is a Plant of no great Beauty, it less deserves a Place in curious Gardens. It may be propagated by Layers, or from Suckers, which arise from the Foot of old Plants, and must be planted in a moist Soil and a shady Situation, where it will thrive exceedingly.

The Fruit of this Tree is often brought into the Markets of London, and sold for *Buckthorn-Berries*; of which Cheat, all such as make Syrup of *Buckthorn* should be particularly careful: They may be easily distinguish'd by breaking the Berries, and observing how many Seeds are contain'd in each, the Berries of this Tree having but two, and those of *Buckthorn*, generally four Seeds in each Berry.

FRAXINELLA; [is so call'd of *Fraxinus*, Lat. the *Ash-tree*, because its Leaves resemble those of the *Ash-trees*, q. d. the little *Ash*: It is call'd *Distamnus*, because it has the Smell, Taste and Virtues of it.] Bastard, or White Dittany.

The Characters are;

It hath a perennial Root: The Leaves are pennated like those of the *Ash*: The Flower consists of many Leaves, and are of an anomalous Figure, four of these Petals growing on the Upper side, and one or more on the Under side of the Flower; in the Center of which are produc'd nine or ten crooked Stamina or Threads; each Flower is succeeded by many Pods, which are turn'd back like a Ram's-horn, and open in two Parts, emitting several large, hard, black, shining Seeds.

The Species are;

1. **FRAXINELLA**; Clus. White Bastard Dittany; or *Fraxinella*, with white Flowers.

2. **FRAXINELLA**; *purpurea*, *major*, *multiflora*. H. R. Par. Great Purple *Fraxinella*, with many Flowers.

There are some other Varieties of this Plant, which are preserv'd in some curious

Gardens Abroad; but these two are the only Sorts I have ever yet observ'd in England.

They are propagated either by sowing their Seeds, or parting the Roots: The latter Method being the most expeditious, is generally us'd; though, if we would supply our selves with a Quantity of these Plants, we must procure them from Seeds, for the Roots do not multiply very fast, nor should they be disturb'd by parting them oftener than every other Year; for if you part them frequently, or into small Heads, the Flowers will be few in Number, and very weak.

The best Season to transplant these Roots, is toward the latter End of September, or Beginning of October, that they may be rooted before the hard Frosts begin, by which means they will be enabled to resist the Cold, and produce much fairer Flowers than those which are transplanted in the Spring. The Soil in which these Plants thrive best, is a fresh, rich, gentle Loam, not too stiff, or wet, in both of which they are apt to rot in Winter.

If you would propagate them by Seeds, you must sow them on a Bed of good fresh Earth in an open Exposure, soon after the Seeds are ripe; for if they are kept till Spring before they are sown, they either miscarry, or lie in the Ground till the next Spring before they come up; but you must carefully observe to weed the Bed, for if you suffer the Weeds to root deep in the Ground, they will endanger the drawing of the Seeds out of the Earth when the former are pull'd up: If the Spring should prove dry when your Plants first appear, you should gently water the Bed, and shade it with Mats in the Heat of the Day, until the Plants have got Strength, observing, as before, to keep them clear from Weeds: In this Bed they may remain until *Michaelmas* following; at which Time you should prepare one or more Beds (according to the Number of your Plants) of the like fresh Earth, into which you must plant your Plants at about five or six Inches Distance each Way, being careful in taking them out of the Seed-bed, not to break or wound their Roots, as also to close the Earth fast to their Roots when planted with your Hands, to prevent their being turn'd out of the Ground by Frost. In these Beds they may remain one Year, by which time (if they have thriven well) they will be strong enough to produce Flowers the succeeding Year; so that now it will be time to transplant them into the Borders of the Flower-Garden where they are design'd to remain.

These Plants continuing a long time in Beauty, are very great Ornaments to a Garden; and their being very hardy, requiring but a little Culture, renders them worthy of a Place in every good Garden.

FRAXINUS; The *Ash-Tree*.

The Characters are;

It hath pennated Leaves, which mostly end in an odd Lobe: The Male Flowers (which grow at a remote Distance from the Fruit) have no Petals, but consist of many Stamina: The Ovary becomes a Seed-vessel, containing one Seed
at

at the Bottom, which is shap'd like a Bird's Tongue.

The Species are;

1. FRAXINUS; *vulgaris*. Park. Theat. The Common Ash-Tree.

2. FRAXINUS; *vulgaris*, folio ex luteo variegatis. The Strip'd Ash.

3. FRAXINUS; folio rotundiore. C. B. The Manna Ash.

4. FRAXINUS; *florifera*, botryoides. M. H. R. Blas. The Flowering Ash.

5. FRAXINUS; ex Nova Angliâ, pinnis foliorum in macronem productioribus. Rand. New-England Ash, with sharp-pointed Leaves.

6. FRAXINUS; *Caroliniana*, latiori fructu. Rand. Carolina Ash, with broad Keys.

The first Sort is a common Timber Tree in every Part of England.

The second is a Variety of the first, from which it only differs, in having its Leaves beautifully strip'd with yellow,

The third Sort is suppos'd to be the Tree from whence the true *Calabrian Manna* is taken.

The fourth Sort was rais'd from Seeds by Dr. Uvedale at Enfield, which were brought from Italy by the late curious Botanist Dr. William Sherrard, who suppos'd this was different from Dr. Morison's Tree. But by the Specimens now in Possession of that worthy Encourager of Botanical Studies, Sir Hans Sloane, Bart. it appears to be the very same; notwithstanding Mr. Ray supposes Dr. Morison's Tree to be of American Growth.

The fifth and sixth Sorts were both rais'd from Seeds which came from America, but are both of 'em very hardy. All these Kinds may be propagated by Budding them into the common Ash, upon which they will all take very well, and become hardier than upon their own Stock.

The common Ash is propagated by sowing the Keys in October or November on a Bed of fresh Earth, which should be well dug, and cleans'd from Roots and noxious Weeds: A small Bed will be sufficient to raise a great Quantity of these Trees. The Seeds should be sown pretty thick, and cover'd about half an Inch thick with Earth.

These Seeds many times continue until the second Spring before they come up; you should therefore let the Bed remain undisturb'd and keep it clean from Weeds. When your Plants come up, you must also keep them very clear from Weeds; and if the Season should prove very dry, if you give them now-and-then a little Water, it will greatly promote their Growth; In this Bed they should remain no longer than the Autumn following, provided they have grown well; at which Time you should prepare a Nursery, which should be well dug and clear'd, as before; then with your Spade loosen the Roots of the Plants before you draw them up, otherwise you will endanger the breaking of them. When you have drawn them out of the Ground, shorten the downright Tap-Root; but do not cut off any of the lateral Fibres: Then having

prepar'd your Ground, plant them in Rows, three Feet Distance Row from Row, and a Foot asunder in the Rows, closing the Earth to their Roots with your Feet. In this Nursery they may remain three or four Years, observing to keep them clear from Weeds, as also to trim up the Side-Branches every Winter, and dig the Ground between the Rows; after which Time you may remove them where they are to remain for good.

This Tree will grow upon almost any Soil: but the better the Soil is, the more the Tree will increase in Bulk. Notwithstanding which, it should not by any means be planted too near to other Trees or Plants; for it will exhaust all the Goodness of the Soil from them; and the Shade of this Tree is malignant to most other Plants. The Distance they should be planted is eight Feet square; and after they have been planted one Year, you may cut down every other Tree, chusing such of 'em as are crooked, within six or eight Inches of the Ground; this will cause 'em to make many strong, vigorous Shoots, which in four or five Years Time will be fit for Arbor Poles, or to make Hoops: And the other remaining strait Trees may be suffer'd to grow for other Timber, the Number of which Trees may be lessen'd as they increase in Bulk, leaving still the most promising ones to grow for larger Timber.

If a Wood of these Trees is rightly manag'd, it will turn greatly to the Advantage of its Owner, for by the Under-wood, which will be fit to cut every five or six Years for the Uses above mention'd, there will be a continual Income more than sufficient to pay the Rent of the Ground, and all other Charges, and still there will be a Stock preserv'd for Timber, which, in a few Years, will be worth forty or fifty Shillings per Tree.

This Timber is of excellent Use to the Wheelwright and Cartwright for Ploughs, Axle-Trees, Wheel-Rings, Harrows, Bulls, Oars, Blocks for Pullies, and many other Purposes.

The best Season for Felling of these Trees is from November to February; for if it be done either too early in Autumn, or too late in the Spring, the Timber will be subject to be infested with Worms and other Insects: but for Lopping of Pollards, the Spring is preferable for all soft Woods.

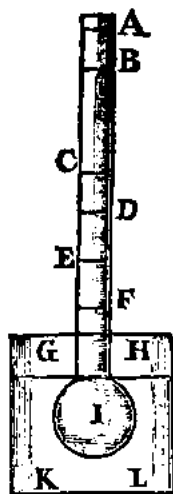
FREEZING, is the fixing of a Fluid, or the depriving it of its natural Mobility by the Action of Cold; or it is the Act of converting a fluid Substance into a firm, coherent, rigid one call'd Ice.

The principal Phenomena of Freezing, are;

1st, That Water being dilated or rarify'd, and all Fluids, Oil excepted, *i. e.* in freezing, take up more Space, and are specifically lighter than they were before.

That the Bulk and Dimensions of Water are increas'd by Freezing, is found by many Experiments: And it may not be improper here to take notice of the Process of Nature.

A Glass Vessel then I A full of Water to A, being immerg'd in a Vessel of Water mix'd with Salt G H K L, the Water presently rises from D to C;



which seems owing to the sudden Construction of the Vessel, hastily plung'd into so cold a Medium: Soon after from the Point C it continually descends condensing, till it arrives at the Point F; where for some time it seems to remain at Rest: But it soon recovers it self, and begins to expand, rising from F to E, and from thence soon after, by one violent Leap, mounts to B; and here the Water in I is immediately seen all thick and cloudy, and in the very Instant of this Leap is converted into Ice. Add, that while the Ice is growing harder, and some of the Water near the Neck of the Vessel I is freezing, the Flux of the Water is continu'd above B towards A, and at length runs out at the Vessel.

2dly, That they lose not only of the specifick, but also of their absolute Gravity by freezing; so that when they are thaw'd again, they are found considerably heavier than before.

3dly, That frozen Water is not quite so transparent as when it was liquid; and that Bodies don't perspire so freely through it.

4thly, That Water, when frozen, evaporates almost as much as when fluid.

5thly, That Water does not freeze in *vacuo*, but requires the Presence and Contiguity of Air.

6thly, That Water which has been boil'd, does not freeze so readily as that which has not.

7thly, That Water being cover'd over with a Surface of Oil of Olives, does not freeze so readily as it does without it; and that Nut Oil absolutely preserves it under a strong Frost, when Olive Oil will not.

8thly, That Spirit of Wine, Nut Oil, and Oil of Turpentine do not freeze at all.

9thly, That the Surface of the Water in freezing appears all wrinkled; the Wrinkles being sometimes in Parallel Lines, and sometimes like Rays, proceeding from a Centre to the Circumference.

The Theories of Freezing, or the Method of accounting for these Phenomena are very many.

The chief Principles that different Authors have gone upon, are either, that some foreign Matter is introduc'd within the Pores of the Fluid, by means of which it is fix'd, its Bulk increas'd, &c.

Or that some Matter which was naturally contain'd in the Fluid, is now expell'd; by reason of the Absence of which the Body becomes fluid, &c.

Or that there is some Alteration produc'd in the Texture or Form, either of the Particles of the Fluid it self, or of something that is contain'd within it.

To some one of these Principles, all the Systems of Freezing are reducible.

The Cartesians explicate Freezing by the Recess or going out of the Etherial Matter from the Pores of the Water, or other Liquor; which being once done, the finer Parts are too small and flexible to keep the long, slender and Eel-like Particles of Water fluent, or in the Form of a Liquor.

But the Corpuscularians, or Gassendists, ascribe the freezing of Water, with more Probability, to the Ingress of Multitudes of cold or frigorick Particles, as they call them, which entering the Liquor in Streams, and dispersing themselves every Way thro' it, do crowd into the Pores of the Water, and hinder the wonted Agitation of its Parts, and wedge it up, as it were, into the hard or consistent Body of Ice; and from hence proceeds its Increase of Dimensions, Coldness, &c.

That Ice is specifically lighter than the Water out of which it is by freezing made, is certain by its swimming in it; and that this Lightness of Ice proceeds from those numerous Bubbles which are produc'd in it by its Congelation is equally plain: But how those Bubbles come to be generated in freezing, and what Substance they contain in them, if they are not quite empty, is an Inquiry of great Importance, and, perhaps, if discover'd, may contribute much to the understanding the Nature of Gold.

Mr. Hobbs will have it common Air, which intruding into the Water in Congelation, intrangles it self with the Particles of the Fluid, prevents their Motion, and produces those numerous Bubbles, thus expanding its Bulk, and rendering it specifically lighter.

But in answer to this, no such Ingress of Air into Water appears in its Coagulation; and that it does not get into frozen Oil is plain, because that Body is condens'd by being frozen.

And Mr. Boyle has also shewn, by undoubted Experiments, that Water will freeze in Vessels hermetically seal'd, and into brass Bodies or Vessels closely stop'd, and into which the Air can have no Ingress, hath yet been turn'd into Ice, abounding with these Bubbles as numerous as in those frozen in the open Air.

He also has prov'd by Experiment, that Water kept a while in the exhausted Receiver, till all its Bubbles were emerg'd and gone, being afterwards turn'd into Ice by a freezing Mixture, the Ice had scarce any Bubbles in it: Whence it is plain, that these Bubbles are fill'd with some Matter which is within the Water, if they are fill'd with any thing: But he proves also, by plain Experiments, that they have none, or exceedingly little true elastic Air contain'd in them.

Others, and those of the greatest Number, are of Opinion, that the freezing Matter is a Salt; and they argue, that an Excess of Cold will render Water torpid, but never congeal it without Salt: They say, that those Particles that are the chief Cause of freezing, are Saline

Saline mix'd in a due Proportion, Congelation bearing a near Relation to Crystallization.

This Salt is suppos'd to be of the nitrous Kind, and to be furnish'd by the Air, which is generally found to abound in Nitre.

It is indeed no difficult Matter to account for the Particles of Nitre preventing the Fluidity of Water. These Particles are suppos'd to be so many rigid pointed Spicula, which are easily impell'd, or driven into the *Stamina* or Globules of Water; which by this means becoming variously mingled, and intangled with it, do by degrees weaken and destroy the Motion of it.

The Reason that this Effect arises only in severe Winter Weather, is, that it is then only that the retracting Action of the nitrous *Spicula* is more than equal to the Power or Principle, by which the Fluid is otherwise kept in Motion, or dispos'd for Motion.

Several Experiments of artificial Freezing support this Opinion.

For if you mix a Quantity of common Salt-Petre with Snow, or Ice pulveriz'd, and dissolve the Mixture in the Fire, and then immerge a Tube full of Water in the Solution, the Water, that Part of it next the Mixture, will freeze presently, even in a warm Air.

Whence they argue, that the *Spicula* of the Salt is driven through the Pores of the Glafs, and mix'd with the Water, by the Gravity of the Mixture and of the incumbent Air: For that it is evident that the Salt has this Effect, inasmuch as it is certainly known, that the Particles of Water cannot find their Way through the Pores of the Glafs.

In these artificial Freezings, in whatever Part the Mixture is apply'd, there is presently a Skin or *Lamina* of Ice produc'd, whether at the Top, Bottom, or Sides, by reason that there is always a Stock of saline Corpuscles sufficient to overpower these Particles of Fire; but natural Congelations are confin'd to the Top of the Water, where the last most abounds.

But this System is oppos'd by the Author of the *Nouvelle conjecture pour expliquer la Nature de la Glace*, who objects that it does not appear, that Nitre always enters the Composition of Ice; but if it did, it would fall short of accounting for some of the principal Effects; as,

How should the Particles of Nitre, by entering the Pores of the Water, and fixing the Parts, cause the Water to dilate, and render it specifically lighter? They should naturally augment its Weight.

This, and some other Difficulties shew the Necessity of a new Theory, and therefore the ingenious Author advances this which follows, which seems to solve the *Phænomena* in a manner that is more easy and simple, as not depending upon the Admission or Extrusion of any heterogeneous Matter.

That Water freezes in the Winter only, because its Parts then being more closely join'd together, do mutually embarrass one another, and lose all the Motion they had; and that

the Air, or rather an Alteration in the Spring and Force of the Air, is the Cause of this closer Union of Water.

It is evident from Experiment; that there are an infinite Number of Particles of gross Air interspers'd among the Globules of Water, and it is allow'd, that each Particle of Air has the Virtue of a Spring: And hence this Author argues, that the small Springs of gross Air mix'd with Water, have more Force in cold Winter Weather, and do then unbend themselves more than at other Times: Hence those Springs thus unbending themselves on one Side, and the external Air continuing to press the Surface of the Water on the other, the Particles of the Water being thus constring'd and lock'd up together, must lose their Motion and Fluidity, and form a hard consistent Body, till a Relaxation of the Spring of the Air from an Increase of Heat, reduce the Particles to their old Dimensions, and leave Room for the Globules to flow again.

But this System seems to be built upon a false Principle; for the Spring or Elasticity of the Air is not increas'd by Cold, but diminish'd: Air condenses by Cold, and expands itself by Heat; and it is demonstrable in Pneumatics, that the elastick Force of expanded Air is of that to the same Air as condens'd, as the Bulk when rarefied is to its Bulk when condens'd.

Indeed, some Authors, in order to account for the Increase of the Bulk and Dimension of the specific Gravity of frozen Water, have advanc'd as follows, *viz.* That the aqueous Particles in their natural State were nearly Cubes, and so fill'd their Space without the Interposition of many Pores; but that they are chang'd from Cubes to Spheres by Congelation: From whence it will necessarily follow, that there must be a great deal of empty Space between them.

But in opposition to this Hypothesis, the Nature of Fluidity and Firmness easily suggests, that spherical Particles are much properer to constitute a Fluid than cubical ones, and less dispos'd to form a fix'd than cubick one.

But after all, in order to come at a consistent Theory of Freezing, we must either have Recourse to the frigorick Matter of the *Corpuscularians*, consider'd under the new Light and Advantages of the *Newtonian* Philosophy, or to the *Ætherial* Matter of the *Cartesians*, under the Improvements of *Monf. Gauteron*.

The true Cause of Freezing, or the Congelation of Water into Ice, say the former, seems plainly to be the Introduction of the frigorick Particles into the Pores or Interstices between the Particles of the Water, and by that means getting so near them, as to be just within the Spheres of one another's *attracting Force*, and then they must cohere into one solid or firm Body. But Heat afterwards separating them, and putting them into various Motions, breaks this Union, and separates the Particles so far from one another, that they get out of the Distance of the *attracting Force*, and into the Verge of the *repelling Force*.

Force, and then the Water reassumes its fluid Form.

Now that Cold and Freezing do proceed from some Substance of a saline Nature floating in the Air, it seems probable from hence,

That all Salts, and more eminently some particular ones, do prodigiously increase the Force and Effects of Cold, when mix'd with Snow or Ice. It is also evident, that all saline Bodies do produce a Stiffness and Rigidity in the Parts of those Bodies into which they enter.

It appears by microscopical Observations upon Salts, that the Figure of some Salts, before they shoot into Masses, are thin, double-wedg'd like Particles which have abundance of Surface, in respect to their Solidity; and is the Reason why they swim in Water, when once rais'd in it, tho' specifically heavier.

These small Points getting into the Pores of the Water, whereby they are also in some measure suspended in the Winter-time, when the Heat of the Sun is not ordinarily strong enough to dissolve the Salts into a Fluid, to break their Points, and to keep them in perpetual Motion; being less disturb'd, are at more liberty to approach one another, and by shooting into Crystals of the Form above mention'd, do, by both their Extremities, insinuate themselves into the Pores of the Water, and by that means freeze it into a solid Form. And it is apparent, that the Dimensions of Water are increas'd by freezing, the Particles of it being kept at some Distance from one another by the Intervention of the frigorifick Matter.

But besides this, there are many little Volumes or small Particles of Air, included at several Distances, both in the Pores of the watery Particles, and in the Interstices form'd by their spherical Figure. Now by the Insinuation of the Crystals, the Volumes of Air are driven out of the watery Particles, and many of them uniting, form larger Volumes, which thereby have a greater Force to expand themselves than when they are dispers'd; and so both enlarge the Dimensions, and lessen the specific Gravity of Water thus congeal'd into Ice.

And hence (says Dr. Cheyne, from whom this last Account is taken) we may guess at the Manner how Water impregnated with Salts, Sulphurs, or Earths, which are not easily dissolvable, may form it self into Metals, Minerals, Gums, and other Fossils; the Parts of these Mixtures becoming a Cement to the Particles of Water; or getting into their Pores, change them into these different Substances.

For the second: As an Etherial Matter or Medium is generally allow'd to be the Cause of the Motion of Fluids; and as the Air it self has all its Motion from the same Principle; it follows, that all Fluids must remain in a State of Rest or Fixity, when that Matter loses of its necessary Force. And consequently, the Air being less warm'd in the Winter-time, by reason of the Obliquity of the Sun's Rays, the Air is more dense and fix'd in Winter than any other Season of the Year.

But farther: It is evident from divers Experiments, that the Air does contain a Salt which is suppos'd to be of the Nature of Nitre. If this be granted, and the Density of the Air allow'd, it will follow, that the Particles of this Nitre must likewise be brought nearer together, and thicken'd by the Condensation of the Air: As, on the contrary, a Rarefaction of the Air, and an Augmentation of its Fluidity, must divide and separate them.

And if the same happens to all Liquors that have imbib'd or dissolv'd any Salt; if the Warmth of the Liquid keep the Salt exactly divided; and if the Coolness of a Cellar, or of Ice, cause the Particles of the dissolv'd Salt to approach, run into each other, and shoot into Crystals; Why should the Air, which is allow'd to be a Fluid, be exempt from the general Law of Fluids?

'Tis true, that the Nitre of the Air being grosser in Cold Weather than in Hot, must have a less Velocity; but still the Product of its augmented Mass into the Velocity that remains, will give it a greater Momentum or Quantity of Motion. Nor is there any thing farther requir'd to make this Salt act with greater Force against the Parts of Fluids; and this may probably be the Cause of the great Evaporation in Frosty Weather.

This Aerial Nitre must necessarily promote the Concretion of Liquids; for it is not the Air, nor yet the Nitre that it contains, which gives the Motion to Fluids; 'tis the Etherial Medium: therefore a Diminution of the Motion of Rest arises from the Diminution of that Force.

Now the Etherial Matter, which in the Winter-time is weak enough, must still lose more of its Force by its Action against Air condens'd and loaded with large Particles of Salt. It must therefore lose of its Force in Cold Weather, and becomes less dispos'd to maintain the Motion of the Fluids.

In fine: The Air, during Frost, may be esteem'd like the Ice impregnated with Salt wherewith Liquors are iced in Summer-time. It is very probable that these Liquors freeze by reason of a Diminution of the Motion of the Etherial Medium, by its acting against the Ice and Salt together; and the Air is not able to prevent its Concretion by all its scorching Heat.

The Air (says Mr. Boyle) being a Fluid as well as Water, and impregnated with Salts of different Kinds, 'tis not improbable that what happens in Water impregnated with such Salts may also happen in the Air. Two proper Quantities of different Salts being dissolv'd in hot Water, they floated undistinguishably in it, and retain'd a Capacity to act in Conjunction upon several Occasions: yet when the Liquor becomes cold, the saline Particles of one Kind being no longer agitated by a due Degree of Heat, shot into Crystals, and losing their Fluidity and Motion, visibly separated themselves from the other, which still continu'd fluid in the Liquor, and capable of acting separately.

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We have divers Accounts in the *Philosophical Transactions*, of a freezing Rain which fell in the West of England in December 1672. This Rain, as soon as it touch'd any thing above the Ground, as a Bough, or the like, immediately settled into Ice, and by multiplying and enlarging, the Icicles broke all down with its Weight; the Rain that fell on the Snow immediately froze into Ice, without sinking into the Snow at all.

It made an incredible Destruction of Trees beyond any thing in all History. A certain Gentleman weigh'd a Sprig of an *Ash-Tree* of just three Quarters of a Pound: The Ice which was on it weigh'd 16 Pounds: That some Persons were frighted with the Noise in the Air, till they understood that it was the Clatter of Icy-Boughs dash'd against each other.

Dr. Beale observes, that there was no considerable Frost observ'd on the Ground during the whole time; whence he concludes, that a Frost may be very fierce and dangerous on the Tops of some Hills and Plains; while in other Places it keeps at two, three, or four Feet Distance above the Ground, Rivers, Lakes, &c. and may wander about very furious in some Places, and remits in others not far off. The Frost was follow'd by glowing Heats, and a wonderful Forwardness of Flowers and Fruits.

FRITILLARIA; Fritillary or Checquer'd Tulip.

The Characters; are

The Flower consists of six Leaves, and is of the Bell-shap'd Lilly Flowers, pendulous, naked, and for the most part checquer'd: The Style of the Flower becomes an oblong Fruit, which is divided into three Cells, and fill'd with six Seeds, lying in a double Row: The Root consists of two fleshy Knobs, which are for the most part semi-globular, betwixt which arises the Flower-stalk.

The Species are;

1. FRITILLARIA; *serotina, floribus ex flavo virentibus*. C. B. The late flowering Fritillary, with greenish-yellow Flowers, commonly call'd, the Leather Coat, or Common Fritillary.

2. FRITILLARIA; *alba; praeox*. C. B. The early White Fritillary.

3. FRITILLARIA; *alba, variegata*. C. B. The white checquer'd Fritillary.

4. FRITILLARIA; *serotina, floribus ex flavo virentibus, major*. Boerb. Ind. The great late flowering Fritillary, with a greenish yellow Flower; or the Common Fritillary, by some call'd Snakes-head Iris.

5. FRITILLARIA; *flavo flore*. Clus. The Yellow Fritillary.

6. FRITILLARIA; *praeox, purpureo variegata*. C. B. Early Purple variegated Fritillary.

7. FRITILLARIA; *folio splendente, flore majore, ex viridi, & purpurâ variegato splendente*. Boerb. Ind. Shining-leav'd Fritillary, with a large Green and Purple-shining variegated Flower, commonly call'd the Monster.

8. FRITILLARIA; *umbellifera*. C. B. Many flower'd Fritillary.

9. FRITILLARIA; *lutea, maxima, Italica*. Park. Par. Greatest Yellow Italian Fritillary.

10. FRITILLARIA; *serotina, floribus ex flavo-virentibus, flore pleno*. H. R. Par. Late Fritillary, with double greenish yellow Flowers.

11. FRITILLARIA; *nigra*. Lob. Adv. Black Fritillary.

12. FRITILLARIA; *flore ex rubro purpureo, & viridi variegato*. Boerb. Ind. Fritillary with a reddish Purple Flower strip'd with Green.

13. FRITILLARIA; *flore ex pallide viridi & viete purpureo variegato*. Boerb. Ind. Fritillary with a Pale Green Flower, variegated with a deep Purple.

14. FRITILLARIA; *Isabella dicta, floribus ex pallide rubicundo virentibus*. H. L. Isabella Fritillary, with a pale red greenish Flower.

15. FRITILLARIA; *maxima, flore obsoleta purpura*. Tourn. The greatest Fritillary, of a worn out Purple Colour, commonly call'd the Persian Lilly.

16. FRITILLARIA; *minima*. Swert. Flor. The least Fritillary, or small Persian Lilly.

17. FRITILLARIA; *lutea, folio foligonati, fructu brevior*. Boerb. Ind. Yellow Fritillary, with a Leaf like Solomon's Seal, and a short Fruit.

There are several other Varieties of this Flower which are propagated in curious Flower-Gardens Abroad, (especially in Holland) which differ in the Colour or Size of their Flowers; but as these are only Varieties which were obtain'd from Seeds, so it would be needless to mention them in this Place, since there will be new Varieties obtain'd every Year where People are curious in sowing their Seeds.

These Plants are propagated either by Seeds, or Off-sets from the old Roots: By the first of which Methods new Flowers will be obtain'd, as also a larger Stock of Roots in three Years than can be obtain'd in twenty or thirty Years in the latter Method: I shall therefore first treat of their Propagation by Seeds.

Having provided your self with some good Seeds, sav'd from the fairest Flowers, you must procure some shallow Pans or Boxes, which must have some Holes in their Bottoms to let out the Moisture: These you should fill with light fresh Earth, laying a few Potshards over the Holes to prevent the Earth from stopping them; then having laid the Earth very level in the Boxes, &c. you must sow the Seeds thereon pretty thick, covering it with fine sifted Earth a quarter of an Inch thick. The time for sowing the Seed is about the Beginning of August, for if it be kept much longer out of the Ground it will not grow; then place the Boxes or Pans where they may have the Morning Sun until 11 a Clock, observing, if the Season proves dry, to water them gently, as also to pull up all Weeds so soon as they appear; for if they are suffer'd to remain until they have taken deep Root into the Earth, they would draw the Seeds out of the Ground whenever they are pull'd up. Toward the latter End of September you should remove the Boxes, &c. into a warmer Situation, placing them under a Hedge or Wall expos'd to the South; in which Place they may remain until the Middle of March, by which Time

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the Plants will be come up an Inch high: you must therefore remove the Boxes as the Weather increaseth hot, into a more shady Situation; for while the Plants are young they are liable to suffer by being too much expos'd to the Sun: And in this shady Situation they may remain during the Heat of the Summer, observing to keep them clear from Weeds, and to refresh them now and then with a little Moisture, but be careful not to give them much Water after their Leaves are decay'd, which would rot the Roots. About the Beginning of *August*, if the Roots are very thick in the Boxes, you should prepare a Bed of good light fresh Earth, which must be levell'd very even, upon which you should spread the Earth in the Boxes in which the small Roots are contain'd, equally covering it about one Fourth of an Inch thick with the same fresh Earth: This Bed should be situated in a warm Position, but not too close to Hedges, Walls, or Pales, which would cause their Leaves to be long and slender, and make the Roots weaker than if plac'd in a more open Exposure.

In this Bed they may remain until they flower, which is generatly the third Year from sowing; at which time you should put down a Mark to the Roots of all such as produce fair Flowers: and at the time of taking them out of the Ground (which ought to be soon after their green Leaves are decay'd) may be selected into a Bed amongst your old Roots of this Flower, which for their Beauty are preserv'd in the best Gardens; but the other less valuable Flowers, may be planted in the Borders of the Parterre Garden for their Variety, where being intermix'd with other Flowers of different Seasons, they will make a good Appearance.

The fine Sorts of this Flower should remain undisturb'd three Years, by which time they will have produc'd many Off-sets, and should be therefore taken up when their Leaves are decay'd, and planted into a fresh Bed, taking such of their Off-sets as are large enough to produce Flowers to plant in the Flower-Garden, but the smaller Roots may be planted into a Nursery-bed until they have obtain'd Strength enough to flower; but you must never suffer these Roots to lie out of the Ground when you remove them, but plant them again immediately, for otherwise they will perish.

During these three Years which I have advis'd the Roots to remain in the Beds, the Surface of the Earth should be stir'd every Autumn with a Trowel, observing not to go so deep as to bruise the Root, and at the same time lay a thin Cover of very rotten Dung or Tanner's Bark upon the Surface of the Beds; which being wash'd into the Ground, will cause the Flowers to be larger, as also the Roots to make a greater Increase: You must also observe to keep them constantly clear from Weeds, and those Roots which you would preserve with Care, should not be suffer'd to feed.

FRITILLARIA CRASSA; *vide* Asclepias.

FRONDOSE, [*Frondosus*, Lat.] full of, or apt to bear Leaves.

FRONDOSITY, [*Frondositas*, Lat.] Leafiness, Fullness of Leaves, or Aptness to bear Leaves.

FRONTATED, [*Frontatus*, Lat.] a Term us'd by *Botanists*, relating to the Leaf of a Flower, which grows broader and broader, perhaps terminating in a Right Line, and is us'd in opposition to *Cuspidated*, i. e. when the Leaves of a Flower end in a Point.

FROST may be defin'd to be an excessive Cold State of the Weather, whereby the Motion and Fluidity of the Liquors are suspended; or, it is that State of the Air, &c. whereby Fluids are converted into Ice.

By *Frost*, Metals contract, or are shorten'd. *Mons. Auzout* found by an Experiment, that an Iron Tube twelve Feet long, upon being expos'd to the Air in a frosty Night, lost two Lines of its Length. But this may be suppos'd to be wholly the Effect of Cold.

On the contrary, *Frost* does not contract Fluids; but, on the other hand, swells or dilates them near one-tenth of their Bulk.

Mr. *Boyle* gives us several Experiments of Vessels made of Metals exceeding thick and strong, which being fill'd with Water, close stop'd, and expos'd to the Cold; the Water being expanded by freezing, and not finding either Room or Vent, bursts the Vessels.

A strong Barrel of a Gun with Water in't, being stop'd close and frozen, was rent the whole Length: And a small Brass Vessel five Inches deep, and two in diameter, fill'd with Water, &c. and frozen, lifted up its Lid, which was press'd with a Weight of 56 Pounds.

There are also related many remarkable Effects of *Frost* on Vegetables. *Morery Hist. de France*, says, That Trees are frequently scorch'd and burnt up with *Frost*, as with the most excessive Heat, and that ev'n in so warm a Climate as *Provence*.

Mr. *Bobart* relates, that in the great *Frost* Anno 1683. Oaks, *Asbes*, Walnut-Trees, &c. were miserably split and cleft, so as they might be seen through, and this too with terrible Noises like the Explosion of Fire Arms: That the Cliffs were not only in the Bodies, but continu'd to the larger Boughs, Roots, &c. *Philos. Transact.* N^o 165.

Mr. *Derham* says, That the *Frost* in 1708 was remarkable throughout the greatest Part of *Europe*; and the greatest in Degree, if not the most universal in the Memory of Man: That it extended throughout *England*, *France*, *Germany*, *Denmark*, *Italy*, &c. but was scarce felt in *Scotland* and *Ireland*. All the Orange-Trees and Olives in *Italy*, *Provence*, &c. and all the Walnut-Trees throughout *France* with an Infinity of other Trees, perish'd by the *Frost*.

Mons. Gauteron says, They had a Gangrene on them, which he takes to be the Effect of a corrosive Salt, which corrupted and destroy'd their Texture. He adds, That there is so much Resemblance between the Gangrene befalling

falling Plants through *Frost*, and that which the Parts of Animals are liable to, that they must have some analogous Cause. Corrosive Humours burn the Parts of Animals; and the Aërial Nitre condens'd, has the same Effects on the Parts of Plants. *Memoires de l'Academie Royale des Sciences*, An. 1709.

Mr. *Derham* says, That the greatest Sufferers in the Animal Kingdom were Birds and Insects; but Vegetables were much the greatest Sufferers. That few of the tender Sorts of Vegetables escap'd the Severity of the *Frost*, *Bays*, *Laurels*, *Rosemary*, *Cypress*, *Alaternus*'s, *Phillyrea*'s, *Arbutus*'s, *Laurustinus*'s, and even *Furz*, with most of the frutescent Herbs, as *Lavenders*, *Abrotanum*'s, *Rhue*, *Thyme*, &c. were generally destroy'd. He adds, That the Sap of the finer Wall-Fruit was so congeal'd and destroy'd, that it stagnated in the Limbs and Branches, and produc'd Disorders like to Chilblains in Human Bodies, which would turn to Mortifications in many Parts of the Trees. That the very Buds of the finer Trees, both in the Leaf, Buds, and Blossom-Buds were quite kill'd, and dry'd into a farinaceous Matter.

Mr. *Derham* relates it as a common Observation, That Vegetables suffer'd more from the *Sun*, than from the *Frost*; in that the Sun-shine melting the Snow, and opening the Ground, left it more expos'd to the Rigours of the ensuing Night. It was likewise observ'd, at a Meeting of the *Royal Society*, That the Calamities which beset Trees, arose not purely from their being frozen, but principally from the Winds shaking and rocking them when they were frozen, which rent and parted their Fibres. *Philosoph. Transact.* N° 324.

Hoar-Frost or *White-Frost* is the Dew frozen or congeal'd early in cold Mornings, chiefly in *Autumn*. This (as Mr. *Regis* observes) is an Assemblage of little Parcels of Ice or Crystals, which are of various Figures, according to the different Disposition of the Vapours which met and condensed by Cold.

Dew is, to all Appearance, the Matter of *Hoar-Frost*; tho' many of the *Cartesians* suppose it to be form'd of a Cloud, and either congeal'd in the Cloud, and so let fall, or ready to be congeal'd as soon as it arrives at the Earth.

FRUCTIFEROUS, [*Fruetifer*, Lat.] Fruit-bearing, fruitful.

FRUCTUS; *vide* Fruit.

FRUIT is the Production of a Tree or Plant, for the Propagation or Multiplication of its Kind: In which Sense *Fruit* includes all Kinds of *Seeds*, with their Furniture, &c. *Botanists* use it to signify, properly, that Part of a Plant wherein the Seed is contain'd, which the *Latins* call *Fruetus*, and the *Greeks* *Karpós*.

The Fruit of some Plants are produced singly, as are their Flowers, and sometimes they are produced in Clusters, as in most Fruit-Trees, which are also fleshy; but in many Plants they are dry.

The Word *Fruit* is also us'd to signify an Assemblage of Seeds in a Plant, as in a *Pea*, *Bean*, *Ranunculus*, &c. and in its general Signification, for all Kinds of *Grain*, whether naked, or inclos'd in Cover, *Capsula* or *Pod*; whether bony, fleshy, skinny, membranous; or the like.

Fruit is the Product or Result of the Flower; or that for whose Production, Nutrition, &c. the Flower is intended.

The Structure and Parts of different *Fruits* are different in some Things: but in all the Species, the essential Parts of the Fruit appear to be only Continuations or Expansions of those which are seen in the other Parts of the Tree.

Dr *Beale* suggests some very good Reasons for a direct Communication between the remotest Parts of the Tree and the Fruit; so that the same Fibres or *Stamina* which constitute the Root, Trunk and Boughs, are extended into the very Fruit.

Thus if you cut open an Apple transversely, you will find it to consist chiefly of four Parts: viz. 1. a *Skin*, or *Cortex*, which is only a Production of the Skin or Outer Bark of the Tree; 2. a *Parenchyma* or Pulp, which is an Expansion and Intumescence of the *Ble* or Inner Bark of the Tree; 3. the Fibres or Ramifications of the Woody Part of the Tree; 4. the *Core*, which is the Produce of the Pith or *Medulla* of the Plant, indurated or strengthen'd by Twigs of the Wood and Fibres inosculated therewith: This serves to furnish a Cell or Lodge for the Kernels, filtrates the Juice of the *Parenchyma*, and conveys it, thus prepar'd, to the Kernel.

Of the Fibres, Authors generally reckon fifteen Branches; of which, ten penetrate the *Parenchyma*, and incline to the Basis of the Flower; the other five ascend more particularly from the *Pedicle* or Stalk, and meet with the former at the Base of the Flower; to which Branches the *Capsulae* or Coats of the Kernels are fasten'd.

These Branches being first extended through the *Parenchyma* to the Flower, furnish the necessary Matter for the Vegetation of it: but as the Fruit increases, it intercepts the Aliment; and thus the Flower is starv'd and falls off.

In a *Pear* there are five Parts to be distinguish'd, viz. the *Skin*, *Parenchyma*, *Ramification*, *Stone*, and *Acetarium*.

The three first Parts are common to the *Apple*. The *Stone*, observ'd chiefly in *Coke-Pears*, is a Congeries of strong Corpuscles, that are dispers'd throughout the whole *Parenchyma*, but in the greatest Plenty, and closest together about the Centre or *Acetarium*: it is form'd of the stony or calculous Part of the Nutritious Juice.

The *Acetarium* is a Substance of a tart, acid Taste, of a globular Figure, inclos'd in an Assemblage of several of the stony Parts before mention'd.

In a *Plum*, *Cherry*, &c. there are four Parts, viz. a *Coat*, *Parenchyma*, *Ramification*, and *Nucleus* or *Stone*. The *Stone* consists of two very different Parts: The External or Harder Part,

Part, call'd the *Stone* or *Shell*, is a Concretion of the Stony or Calculous Parts of the Nutritious Juice, like the Stone in *Pears*, and contains a soft, parenchymous Matter within it. The Inner, call'd the *Kernel*, is soft, tender, and light, being deriv'd from the Pith or *Medulla* of the Tree by Seminal Branches, which penetrate the Base of the Stone.

The *Nut* or *Acorn* consists of a *Shell*, *Cortex*, and *Medulla*: The *Shell* consists of a Coat and *Parenchyma*, deriv'd from the Bark and Wood of a Tree.

The *Cortex* consists of an Inner and Outer Part: The first is a Duplicature of the Inner Tunick of the Shell: The second is a Mossy Substance, deriv'd from the same Source as the *Parenchyma* of the Shell. But Authors are not agreed, whether the *Medulla* or Pulp of the Kernel does arise from the Pith of the Tree, or the Cortical Part thereof.

Berries, as *Grapes*, &c. contain (besides three general Parts, viz. Coat, *Parenchyma*, and *Ramification*) Grains of a Stony Nature, to do the Offices of Seed.

Fruits in general are serviceable in guarding, preserving, and feeding the inclos'd Seed; in filtrating the coarser, more earthy, and strong Parts of the Nutritious Juice of the Plant, and retaining it to themselves; sending none but the most pure, elaborated, and spirituous Parts to the Seed, for the Support and Growth of the tender, delicate Embryo or Plantule which is therein contained.

FRUMENTACEOUS [*Fruментaceus*, Lat.] A Term apply'd by *Botanists* to all such Plants as have a Conformity with *Wheat*, (call'd, in *Latin*, *Frumentum*) in respect either of their Fruits, Leaves, Ears, or the like.

FRUMENTUM INDICUM; vide *Mays*.

FRUTEX, a Shrub, a Vegetable of a Genus between a Tree and an Herb, but of a Woody Substance.

FRUTEX; *Africanus*. *Ambram Spirans*. *Volk*. The Amber-tree; *vulgô*.

This Shrub has by no Botanick Writers been reduc'd to any proper Class; so I have taken the Liberty of continuing it under its former loose Name, having never yet seen the Fruit: tho', by the Flower, I imagine it will be a Congener to the *Gallium* or *Ladies Bedstraw*; but I shall not, at present, say any thing of its Characters.

This is preserv'd in most curious Gardens which have Collections of tender Plants. It is easily propagated by planting Cuttings during any of the Summer Months, in a Border of light Earth, which will take Root in six Weeks Time, provided they are water'd and shaded as the Season may require; then they should be taken up, with a Ball of Earth to their Roots, and planted into Pots fill'd with light, sandy Earth, and may be expos'd to the open Air until *October*, at which Time they should be remov'd into the Conservatory, where they should be plac'd as free as possible

from being over-hung with other Plants: And during the Winter-season they must be refresh'd with Water, but should not have too much given 'em each Time: you may let 'em have as much Air as the Weather will permit; for if they are kept too close, they will be subject to grow mouldy, and generally decay soon after.

These Shrubs may be train'd up either to form round Heads, or into Pyramids, it being a very manageable Plant; but should not be often cut: for, by so doing, 'twill occasion the Branches to grow very close, whereby the Air will be excluded from the Middle-part of the Plant, which will cause the Leaves to decay, and the Branches to appear very unsightly: but if you suffer it to grow as it is naturally dispos'd, (only observing to tie up the Stem, to make it strait) the Plant will thrive much better.

The Beauty of this Shrub, is in its small Evergreen Leaves, which grow as close as *Heath*; and being bruised between the Fingers, do emit a very fragrant Odour.

FRUTEX; *Virginianus*, *trifolius*, *Ulni Smar-ris*. *Barist. Pluk. Alm.* American Shrub Trefoil, with Fruit like the Elm.

The Seeds of this Shrub were sent from *Carolina* by Mr. *Catesby*, Anno 1724, from which several Plants have been rais'd in the Gardens near *London*: but since it hath not as yet produc'd any Flowers or Seeds in *England*, I could not tell better where to place it, than under an old Name.

This Shrub is hardy enough to resist the severest Cold of our Climate in the open Air, provided it be planted on a dry Soil. It may be propagated by laying down the Side-Branches into the Ground in the *Spring*, observing to slit them at a Joint, as it is practis'd in laying *Carnations*. When they are pegg'd down, the Earth should be lay'd two or three Inches thick over the Part that is slit; and in dry Weather they should be water'd, which, if duly attended to, will greatly facilitate their Rooting; so that in one Year they will be rooted sufficient to be transplanted out: but if they are not slit, nor the Ground about them water'd in dry Weather, it will be two Years before they will be fit to transplant.

If the Plant likes the Soil into which it is planted, it will make considerable strong Shoots, and the Leaves will be large and fair. There is one of these Shrubs in the *Physick-Garden* at *Chelsea*, which I rais'd from Seeds, Anno 1724, and has been transplanted two Years in the open Air: This Plant is now, Anno 1729, upwards of six Feet high, and will, it's probable, flower in a Year or two more. What Beauty there is in the Flowers thereof, I can't say, as having never seen 'em; but the Straitness of its Growth, with the Beauty and uncommon Shape of the Leaves, render it worthy of a Place in every good Collection of Trees and Shrubs.

FRUTEX; *scandens*, *peirofelini*, *foliis*, *Virginianus*, *claviculis donatus*. *Pluk. Mant.* The Pepper-tree; *vulgô*.

This

This Plant was brought from *Virginia*, where it is found in great Plenty, and was rais'd from Seeds in the Gardens of *Samuel Reynardson* at *Hillindon* near *Uxbridge* many Years since, from whence it hath been distributed into many Gardens near *London*. There is no great Beauty in it, but for its Odness it may have a Place in a Collection of Shrubs. It is extreme hardy, enduring our severest Cold in the open Air, but should be planted on a dry Soil, and will require a Stake to support it; for its Branches are very flexible, and will trail upon the Ground, if they are not supported. The Flowers it produces are very small, and of a greenish-yellow Colour, growing in Clusters somewhat like those of the Creeper, and the Branches do emit Claspers as that doth, to which it appears to me to be nearly related.

This Plant may be propagated by laying down the tender Branches, which in one Year will be rooted enough to transplant; or by Suckers from the Roots, which when the Plants are arriv'd to a convenient Age, they will send forth in great Plenty.

FRUTEX PAVONINUS; *vide* *Poinciana*.

FRUTICOSE; [*Fruticosus*, Lat. a Shrub.] are those Plants which are of an hard, woody Substance.

FUMARIA; *Fumatory*.

The Characters are;

It hath divided Leaves resembling those of the Umbelliferous Plants: The Flowers, which are collected into a Spike, are of an anomalous Figure, somewhat resembling a papilionaceous Flower, consisting of two Petals or Leaves, which open like two Lips, the upper Lip ending in a Spur: The Foot-stalk is join'd to the Middle Part of the Flower: The Fruit is either of a long or a round Figure, which is like a Pod, in which are contain'd many roundish Seeds.

The Species are;

1. **FUMARIA;** *Officinarium* & *Dioscoridis*, flore purpureo. C. B. The Common Fumatory, with a Purple Flower.

2. **FUMARIA;** *minor tenuifolia*. C. B. Lesser narrow-leav'd Fumatory.

3. **FUMARIA;** *sempervirens* & *florens*, flore albo. Flor. Bat. Ever-green Fumatory, with a white Flower.

4. **FUMARIA;** *lutea*. C. B. Yellow Fumatory.

5. **FUMARIA;** *bulbosa, radice cavâ, major*. C. B. Great bulbous-rooted Fumatory, or hollow Root.

6. **FUMARIA;** *bulbosa, radice cavâ, major, flore albo*. C. B. Great bulbous-rooted Fumatory, with a white Flower.

7. **FUMARIA;** *bulbosa, viridi flore*. Tourn. Bulbous-rooted Fumatory, with a green Flower.

8. **FUMARIA;** *bulbosa, radice non cavâ, major*. C. B. Great bulbous-rooted Fumatory, with a Root not hollow.

The first of these Plants is sometimes us'd in Medicine, but is seldom cultivated in Gardens, it being very common in arable Land in most Parts of England.

The second Sort is not a Native of *England*, but is preserv'd in some curious Botanick Gardens for the Sake of Variety. These are both annual Plants.

The third Sort is a Perennial Plant, which if planted in a dry Soil and a warm Situation, will continue flowering almost the whole Year round, which renders it worthy of a Place in every good Garden.

The fourth Sort is also an abiding Plant, which requires the same Situation and Culture as the former. These two Plants will grow in Joints, or hollow Places in old Walls, which will render them less subject to decay than if they were planted in a rich Soil. They may be propagated by sowing their Seeds soon after they are ripe; for if the Seeds are kept till the Spring, they very often miscarry.

The fifth, sixth, seventh, and eighth Sorts are propagated by Off-sets, as other bulbous-rooted Flowers: These produce their Flowers in the Beginning of *April*, and are very pretty Ornaments to Borders in a small Flower-Garden. They are extreme hardy, but do not increase very fast, seldom producing Seeds with us, and their Bulbs do not multiply very much, especially if they are often transplanted. They love a light sandy Soil, and should be suffer'd to remain three Years undisturb'd, in which time they will produce many Off-sets. The best Season for transplanting them is in *May*, when the green Leaves begin to die off; for if they are taken up when their Leaves are fresh, it will greatly weaken their Roots.

FURZ; *vide* *Genista*.

G A

GALE; The Sweet Willow, or Dutch Myrtle.

The Characters are;

The Leaves are plac'd alternately on the Branches: It hath Male Flowers, which are produc'd at the Wings of the Leaves; are naked, and grow in a longish Spike: The Fruit, which is produc'd in separate Parts of the same Tree, is of a conical Figure, and squamose, containing one Seed in each Scale.

The Species are;

1. **GALE;** *frutex odoratus, septentrionalium*, *Eleagnus*, *Cordo*, *Chamaeleagnus*, *Dodonæi* J. B. Sweet Gale, Sweet Willow, or Dutch Myrtle.

2. **GALE;** *quæ Myrto Brabanticae similis*, *Carolinensis*, *baccata*, *fructu, racemoso, sessili monopyreno*. Pluk. Phyt. Candle-Berry Tree; *vulgô*.

3. **GALE;** *quæ Myrto Brabanticae similis*, *Carolinensis*, *humilior, foliis latioribus, & magis serratis*. Catesb. Hist. Nat. Carol. The Dwarf broad-leav'd Candle-Berry Tree, with deeply serrated Leaves.

The first of these Plants is very common in several Parts of *England*, growing upon Bogs which

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which have an open Situation: This is with Difficulty preserv'd in Gardens: It must have a very moist Soil, and should have an open Situation. The best Season for transplanting these Shrubs, is in the Beginning of March, just before their green Leaves appear: In removing them, you should be careful to preserve as much Earth about their Roots as possible; as also to water them plentifully, if the Season should prove dry. They are propagated by Suckers, which are produc'd in great Plenty from their Roots, when they are planted on a proper Soil, but seldom do make any considerable Increase in Gardens; however, any one that has a mind to plant these Shrubs in a Garden, or other Plantation, may be sufficiently supply'd from the Bogs, where they grow spontaneously.

The 2d and 3d Sorts are both Natives of America, and have been rais'd from Seeds which came from thence, but are both hardy enough to resist the Cold of our Climate in the open Air. These are also propagated by Suckers as the former, which, if they are planted in a moist Soil, and suffer'd to remain undisturb'd, they will produce in great Plenty: They may also be increas'd by laying down their tender Branches, which should be slit, as is practis'd in laying of Carnation, and will take Root in one Year, and then may be transplanted where they are to remain. The Seeds of these Plants, when brought from Abroad, should be sown in Pots fill'd with fresh loamy Earth, and then plung'd into a moderate Hot-bed, which will greatly forward their coming up: And as the Season advances, the Pots should by Degrees be remov'd out of the Hot-bed into the open Air, that they may be harden'd before Winter; and in October you should place the Pots into a common Hot-bed Frame, that may be cover'd in hard frosty Weather, which often injures them while they are young, but afterwards they are not liable to any Misfortune from the Seasons: The best time to remove these is in the Spring, just before they begin to shoot, but you should cover the Surface of the Ground round their Roots after they are planted, to prevent the Sun and Wind from entering the Ground to dry their Fibres.

These Shrubs are all of a low Stature with us, seldom rising above five Feet high, and should therefore be planted amongst Shrubs of the same Growth, for they will by no means grow under the Shade of other Trees. They are very proper Plants for small Wilderneys Quarters in a swampy Piece of Ground, where few other Plants will thrive well.

The first Sort casts its Leaves in Winter, but the two other Sorts are ever-green: The Leaves of all these Plants, when bruise'd, do emit a very pleasant Odour, not much unlike that of the Myrtle, from whence the People have been induc'd to give them that Epithet. The Inhabitants of America do prepare a Wax from the Fruit of those two Plants, with which they make very good Candles, which burn very well, and have a very agreeable Scent.

The two last mention'd Sorts do produce Flowers in several Gardens near London; and the first of them did produce Fruit the last Summer Anno 1729. in the curious Garden of Mr. Peter Collinson at Peckham; but the last Sort hath not as yet produc'd Fruit in England, that I have heard.

GALEGA; Goat's-Rue.

The Characters are;

It hath a Perennial Root: The Leaves grow by Pairs, fasten'd to a Mid-rib, terminating in an odd Lobe: The Flower is of the papilionaceous Kind, consisting of a Standard, the Wings, and the Keel: The Pointal becomes a long taper Pod, which is fill'd with oblong Kidney-shap'd Seeds.

The Species are;

1. GALEGA; *vulgaris*, *floribus caeruleis*. C. B. Common Goat's-Rue, with blue Flowers.
2. GALEGA; *vulgaris*, *floribus penitus candidantibus*. C. B. Common Goat's-Rue, with white Flowers.
3. GALEGA; *vulgaris*, *floribus ex caeruleo purpureis*. C. B. Common Goat's-Rue, with bluish Purple Flowers.
4. GALEGA; *Africana*, *floribus majoribus*, & *siquis crassioribus*. Tourn. African Goat's-Rue, with large Flowers and thick Pods.

There are several other Varieties of this Plant which are preserv'd in curious Botanick Gardens Abroad, but these here mention'd are the chief Sorts we have at present in England.

The first of these Plants is propagated in Gardens for Medicinal Use; and the second and third Sorts are only Varieties of the first, from which they only differ in the Colour of their Flowers, and are for Variety preserv'd in some curious Gardens; but the fourth Sort is a distinct Species, having much larger Leaves, Flowers, and Pods.

These Plants may be propagated either from Seeds, or by parting of their Roots. The best Season for sowing the Seeds is in the Beginning of March, in a light Soil and an open Situation; and when the Plants are come up, you should either hoe between them to destroy the Weeds, (as is practis'd for Onions, Carrots, &c.) or else pull out the Weeds with your Hands, cutting down, or pulling up the Plants where they are too close to each other, that those left may have Room to get Strength; and so from time to time, as the Weeds come up, you must be very careful to destroy them, as also to cut up or draw out the Plants where they are too thick, for they should not be left closer than eight or nine Inches Distance from each other. The second Year these Plants will flower, and produce ripe Seeds; but if you intend to continue your Plants for Use, you should cut off the Herb when it is in flower, and not permit it to stand until it seeds, which very often causes the Plants to decay. These Roots may also be parted into small Heads in Autumn, for Increase; but the seedling Plants are much preferable to these Off-sets, so that the best Way is to propagate this Plant by Seeds.

GALEOP-

GALEOPSIS; Stinking Dead Nettle.

The Characters are ;

It hath a labiated Flower of one single Leaf, whose upper Lip is hollow like a Spoon, but the under one is divided into three Segments, the middle Part being large : The Cup of the Flower is Funnel-jhap'd, and divided into five Parts, and each Flower is succeeded by four naked Seeds.

There are several Species of this Plant which are preserv'd in curious Botanick Gardens, some of which are Natives of England ; but as they are Plants of no great Beauty or Uie, so I shall only mention some few Sorts which deserve a Place in curious Gardens, and pass over the other less valuable Sorts without naming them.

1. *GALEOPSIS; Hispanica, frutescens, teucrii folio.* Tourne. Spanish, shrubby, stinking dead Nettle, with a Tree Germander-leaf.

2. *GALEOPSIS; quod lamium, fruticans, teucrii folio lucido, calice & flore magno, candido, tantum purpurâ variâ notato.* H. C. Shrubby stinking dead Nettle, with a shining Tree Germander-Leaf, and a large white Flower variegated with small purple Spots.

These two Plants arise to the Height of three Feet or more, do grow shrubby, and may be train'd to regular Heads, whereby they will appear very agreeable, being always green, and continue flowering most Part of the Summer; and altho' the Flowers are not very beautiful, yet for their long Continuance in Flower, together with the Variety of their Leaves, they deserve a Place in every good Garden.

These Plants may be propagated by Seeds or Cuttings, as also from Suckers, which arise about their Stems : If you would propagate them by Seeds, you must prepare a Spot of good fresh light Earth, which should be well digg'd and loosen'd, and made very fine and level; into which in March you should sow the Seeds, covering them with the same light Earth about half an Inch thick : When the Plants are come up, which will be towards the Middle or Latter-end of April, you should carefully weed them, and in very dry Weather you should give them a little Water : In August you should take up some of the Plants carefully, and plant them into Pots fill'd with fresh light Earth, that they may be shelter'd during the Winter Season under a common Hot-bed Frame, for these Plants are somewhat tender while young, but when they are grown woody, will resist the severest Cold in the open Air, provided they are planted in a dry Soil : In the Spring after the cold Weather is past, you may shake the Plants out of the Pots, preserving the Earth to their Roots, and plant them in the Places where they are to remain, and in the succeeding Summer they will produce Flowers and Seeds.

If you would propagate them by Cuttings, you should cut off such only as are young and thriving in May, and plant them in a shady Border, watering them as the Season requires; and in August you should take up such of them

as have taken Root, planting them into Pots, and managing them as was directed for the Seedling Plants.

GALLERIES. In order to make a Gallery in a Garden, with Portico's and Arches, a Line must first be drawn of the Length you design the Gallery to be; which being done, is to be planted with Horn-beam, as directed under the Article Horn-beam : which Horn-beams thus planted, are to be the Foundation of the Gallery.

The Management of them is not very difficult, they require only to be digg'd and shear'd a little, when there is occasion.

The chief Curiosity requir'd, is in the ordering the Fore-part of the Gallery, and in forming the Arches.

Each Pillar of the Portico's or Arches ought to be four Feet distant one from the other; the Gallery twelve Feet high, and ten Feet wide, that there may be Room for two or three Persons to walk abreast.

When the Horn-beams are grown to the Height of three Feet, the Distance of the Pillars well regulated, and the Ground-work of the Gallery finish'd, the next thing to be done is to form the Frontispiece : To perform which you must stop the Horn-beam between two Pillars at the Height, and run up a Trellis made for that Purpose, which forms the Arch.

As it grows up, you must with your Shears even those Boughs that out-shoot the others : In time they will grow strong, and may be kept in Form by the Shears.

Portico Galleries may be cover'd with Lime-Trees.

These Galleries were formerly much esteem'd in France, Italy, and other hot Countries, but in England they are seldom made.

GALLIUM; Ladies Bed-straw, or Cheese-Runnet.

The Characters are ;

It is a Plant of the stellate Kind; the Leaves which are neither rough nor knappy, are produc'd at the Joints of the Stalks, five or six in Number in a radiant Form : The Flower consists of one Leaf, which is expanded toward the upward Part, and divided into several Segments; each of these Flowers are succeeded by two dry Seeds.

The Species are ;

1. *GALLIUM; luteum.* C. B. Yellow Ladies Bed-straw.

2. *GALLIUM; rubrum.* C. B. Red Ladies Bed-straw.

3. *GALLIUM; nigro-purpureum, tenuifolium.* Col. Narrow-leav'd Mountain Ladies Bed-straw, with dark Purple Flowers.

4. *GALLIUM; saxatile, glauco folio.* Bocc. Rar. Ladies Bed-straw of the Rocks, with a glaucous Leaf.

5. *GALLIUM; saxatile glabro folio.* Bocc. Rar. Ladies Bed-straw of the Rocks, with a smooth Leaf.

The first of these Plants (which is the Sort commonly us'd in Medicine) is very common in moist Meadows, and in Pasture-grounds in most

most Parts of *England*: The other Varieties are preserv'd in curious Botanick Gardens, but as they are Plants of very little Beauty, and are subject to spread very far, and over-run whatever Plants grows near them, so they are seldom cultivated in other Gardens.

These Sorts may, any of them, be propagated by parting their Roots, which spread and increase very fast, either in the *Spring*, or *Autumn*, and will grow in almost any Soil or Situation, especially the first Sort: The other Sorts do require a drier Soil, but will all grow in any Situation.

GARDENS are distinguish'd into *Flower-Gardens*, *Fruit-Gardens*, and *Kitchen-Gardens*: The first for Pleasure and Ornament, and therefore to be plac'd in the most conspicuous Parts, *i. e.* next to, or just against the Back-front of the House; The two latter for Service, and therefore made in bye Places.

In the Choice of a Place to plant a *Garden* in, the Situation and Exposure of the Ground are the most essential Points to be regarded; because the Success of all depends upon a good Choice: for if a Failure be made in that Point, all the Care and Expence will in a manner be lost; but if a good Choice be made, the Trees, &c. that shall be planted on it will in a short Time thrive, and become both tall and beautiful.

In a *Garden*, the principal Things to be consider'd, are the *Situation*, *Form*, *Soil*, and *Aspect* or *Exposure*.

As for the *Form*, a Square, or rather an Oblong, is most eligible when leading from the Middle of the House, with a Gravel-walk in the midst, having narrow Verges of Grass on each Side, and Rows of Variety of Winter-greens on either Side of the Grass-Verges.

If the Ground be irregular, it may be made uniform so as to afford a Prospect no ways inferior to the most regular. The most irregular Figure may be reduc'd into Order by Strait Lines. There is Beauty in a Triangle, as well as a Square; and the most irregular Spots of Ground may be brought to those two Figures by Borders and Walks.

An Irregularity is easily hid in a large *Garden*, by long Walks and tall Hedges interrupting a distant View: And the little Corners and triangular Spaces may be agreeably fill'd up with Borders of Flowers, Dwarf-Trees, Flowering Shrubs, or Ever-greens. Nor should we be solicitous to throw the whole *Garden* into one single View; since Irregularities and Unevennesses often-times afford many uncommon pretty Devices, &c.

1st. *Situation*: This ought to be such a one as is wholesome, in a Place that is neither too high, nor too low; for if a *Garden* be too high, it will be expos'd to the Winds, which are very prejudicial to Trees: if it be too low, the Dampness of low and marshy Places will be very injurious to Health: besides, the Vermin and venomous Creatures, that breed in Ponds and marshy Places, add much to the Insalubrity of them: Therefore, Situations in Mountainous Places, or in the Bottoms of

Vallies, should not be chosen; but those which are on the Side of an Hill are the more happy.

A Situation on a Rising-ground is most esteem'd; and indeed, if it be not too steep, has the most Advantages, if the Slope be easy and imperceptible, and a good deal of Level may be had.

If the Declivity be easy and insensible, and abounds in Springs of Water, the Situation is very happy, and the most agreeable that can be; for being shelter'd from the Fury of the Winds, and the violent Heat of the Sun, there a temperate Air will be enjoy'd; and the Water that descends from the Top of the Hills, either from Springs or Rain, will supply Fountains, Canals, and Cascades, for Ornaments of Gardens; and besides this, when it has perform'd its Office, will water the adjacent Vallies, and render 'em fertile and wholesome, if it be not suffer'd to stagnate there.

Indeed, if the Declivity of the Hill be too steep, and the Water in too great a Quantity, then a *Garden* on the Side of it may often suffer, by having the Trees torn up by the Torrents and Floods, and the Earth above tumbled down on that below, the Walls thrown down, and the Walks spoil'd.

If the Situation be on a *Plain* or *Flat*, it has several Advantages; Floods and Rains make no Spoil: The Air is even more pure than upon the Side of an Hill: There is a continu'd Prospect of Champains, intersected by Rivers, Ponds, and Brooks, fine Meadows, and Hills cover'd with Buildings or Woods. The level Surface is less tiresome to walk on, and less chargeable than that on the Side of an Hill, Terras-Walks and Steps not being necessary.

2^{dly}, The second thing to be consider'd in chusing a Plat for a *Garden*, in a good Earth or Soil.

It is scarce possible to make a fine *Garden* in a bad Soil: And tho' there are Ways to meliorate Ground, they are very expensive: And sometimes, when the Expence has been bestow'd, of laying good Earth three Feet deep over the whole Surface, when the Roots of the Tree have reach'd the Natural Bottom, a whole *Garden* has been ruin'd.

A good Soil is that which of its own Nature is rich and fruitful: And if the Exposure be Southerly, and healthful, and possess'd of all the Advantages before mention'd; yet still, if it has not a good Body of Earth, and that which is fertile in it self, it is to be fear'd, that whatever is planted in it, will, in a while, droop and die away.

To judge of the Quality of the Soil, observe whether there be any *Heath*, *Thistles*, or other Weeds growing spontaneously therein, which are certain Signs that the Ground is poor. Likewise, if there be large Trees growing thereabouts, observe whether they grow crooked, ill-shap'd and grubby, of a faded Green, and full of Moss, or infested with Vermin; if so, the Place is to be rejected: but, on the contrary, if it be cover'd with good Grass,

Grass fit for Pasture, then you may be encouraged to try the Depth of the Soil.

To know this, dig Holes in several Places six Feet wide, and four Feet deep: if you find three Feet of good Earth, it will do well, but less than two will not be sufficient.

The Quality of good Ground, is neither to be stony, nor too hard to work; neither too dry, nor too moist; nor too sandy and light; nor too strong, as rank and clayey, which is the worst of all for *Gardens*.

3dly, The third Requisite is Water. If this be wanting to a *Garden*, it is one of the greatest Inconveniencies that can attend it, and will bring a certain Mortality upon whatever is planted. By watering, the great Droughts in Summer are allay'd, which would otherwise burn up all the Plants; besides the Usefulness of it in fine *Gardens*, for making *Jets d'Eau*, *Canals*, *Cascades*, &c. which are the greatest Ornaments of a *Garden*.

4thly, The fourth thing requir'd in a good Situation, is the View and Prospect of a fine Country; and tho' this is not so absolutely necessary as the preceding, yet it is one of the most agreeable.

If a *Garden* was planted in a low Place that was bury'd, and that had no kind of Prospect, it would be both disagreeable and unwholesome; the Trees themselves being too much shaded and obscur'd, would not look near so beautiful: whereas a fine View, and the Prospect of a noble Country, are as agreeable Entertainments as a *Garden* can afford.

In short, a *Garden* necessarily requires the Sun, a good Soil, the Care of the Gardener, and Water; and the last, above all, is indispensably necessary: without any of these, there's no good to be expected; and it would be egregious Folly to plant a *Garden* where any of these are wanting.

Of the Designing or Manner of Laying-out a Fine or Pleasure-Garden.

The Area of a handsome *Garden* may take up thirty or forty Acres, not more.

And as for the Disposition and Distribution of this *Garden*, the following Directions may be observ'd.

1st, There ought always to be a Descent from the House to the *Garden* not fewer than three Steps. This Elevation of the Building will make it more dry and wholesome: Also, from the Head of these Steps there will be a Prospect or View of a great Part of the *Garden*.

In a fine *Garden*, the first thing that should present it self to the Sight, should be an open level Piece of Grass, full as broad as the Length of the Front of the Building; which may be surrounded by a Gravel-Walk, for the Convenience of walking in wet Weather.

These Pieces of Grass should not be divided in the Middle with a Gravel-Walk (as is too frequently seen), for it is much more agreeable to view an intire Carpet of Grass

from the House, than to have it intersected by Walks. On the opposite Side of the Gravel-Walks may be Borders for Feet wide four Flowers, which will sufficiently answer the Purpose of *Parterres*; and if from the Back of these Borders there are Ever-greens planted theatrically, it will bound the Prospect very agreeably; and where there are any Objects worthy the Sight, or distant Prospects to be obtain'd, there should be Vista's left.

Groves make the Chief of a *Garden*, being great Ornaments to all the rest of its Parts; so that there cannot be too many of them planted, if the Places design'd for them don't take up those of the *Kitchen* and *Fruit-Garden*, which are very necessary for a House, and should always be plac'd near the Stabling.

To accompany *Parterres*, it is usual to make Choice of those Designs of Wood-work that are the finest; as *Groves* open'd in Compartiments, *Quincunces*, *Verdant Halls*, with *Bowling-greens*, *Arbour-work*, and *Fountains* in the Middle.

These small Groves being plac'd near the House, are so much the more agreeable, in that you have no Need to go far to find Shades; and besides this, they communicate a Coolness to the Apartments, which is very agreeable in hot Weather.

It would also be very proper to plant some Groves of *Ever-greens*, that may afford the Pleasure of seeing a Wood always verdant in Winter, when the other Trees and Plants are depriv'd of their Ornaments; and also to plant some Squares of them to be a Diversity from the other Woods.

It is also usual to adorn the Head of a *Parterre* with Basons, Water-works; and beyond it, with a circular Line of Pallisades or Wood-work cut into a Goose-foot, leading into the great Walks, and to fill the Space between the Bason and the Pallisade with small Pieces of Embroidery or Grass-work, set off with Yews, Vases, and Flower-Pots.

In *Gardens* which have Terrasses either in the Side or Front of the House, where there is a delightful Prospect, so that you cannot shut up the *Parterre* by a circular Pallisade; in order to continue the new View, you should lay several Compartiments of a *Parterre* together, such as *plain Green-plots*, after the modern Fashion, or *Cut-work*; which ought to be divided at convenient Distances by Cross-walks: But the *Parterre* or *plain Green-plot*, must always be next to the House, because it is very agreeable to the Eye.

The principal Walk must be in the Front of the House, and should extend from the *Grass-plot* next the House, to the End of the *Garden*: If they be very wide, the Sides should be turf'd next the Borders, and at the Ends they may be terminated by a Fosse, to continue the View.

If any Part of the Ground be naturally low and marshy, and you would not be at the Expence of filling it, you may in such

Places make *Bowling-greens*, *Water-works* and *Groves*, raising the *Allies* only to the Levels of those that are near them, and that lead thither.

When the great Lines and chief Walks are laid out, and the *Parterres* and Works about the Sides and Head of them are dispos'd so as is most suitable to the Ground, then the rest of the *Garden* is to be furnish'd with many different Designs, as *Tall Groves*, *Close Walks*, *Quincunces*, *Galleries* and *Halls of Verdure*, *Green Arbours*, *Labyrinths*, *Bowling-greens*, and *Amphitheatres*, adorn'd with *Fountains*, *Canals*, *Figures*, &c. Which Sort of Works distinguish a *Garden* well, and do also greatly contribute to the rendring of it magnificent.

It ought always to be observ'd in placing and distributing the several Parts of a *Garden*, to oppose them the one to the other: As for Example, a *Wood* to a *Parterre* or *Bowling-green*, and not to place all the *Wood* on one Side, and all the *Parterres* on the other: Nor is a *Bowling-green* to be set against a *Bason*, for this would be one Gap against another, which is always to be avoided, by setting the full against the void, and the rais'd Works against the flat, in order to cause a Variety.

This Diversity should always be kept, not only in the general Design of a *Garden*, but also in each distinct Piece; as if two *Groves* are upon the Side of a *Parterre*, although their outward Forms and Dimensions should be equal: yet for that Reason the same Design must not be repeated in both, but they should be made so as to be different within, because it would be very disagreeable to find the same Design on both Sides: So that when one has been seen, there is nothing to invite the Curiosity to see the other: so that such a *Garden* so repeated would be no more than half a Design, the greatest Beauty of *Gardens* consisting in Variety.

Also the several Parts of each Piece ought to be diversify'd: If a *Bason* be round, the Walk ought to be *octangular*: And the like is to be observ'd as to *Grass-Plats* and *Bowling-Greens*, which are in the Midst of *Groves*.

The same Works ought never to be repeated on both Sides, except in open Places, where the Eye, by comparing them together, may judge of their Conformity, as in *Parterres*, *Bowling-Greens*, *Groves*, open'd in Compartiments and *Quincunces*: But in such *Groves* as are form'd of *Pallisades* and tall *Trees*, the Designs and out Parts ought always to be varied; but tho' they are to be different, yet however they ought always to have such Relation and Agreement one to the other in their Lines and Ranges, as to make the Openings, Glades, and Vista's regular and agreeable.

In the Business of Designs, a mean and pitiful Manner ought to be studiously avoided, and the Aim should always be at that which is great and noble; not to make *Cabinets* and *Mazes* small, and *Basons* like Bowl-Dishes, and *Allies* so narrow, that two Persons can scarce

walk in them. It is much better to have but two or three Things pretty large, than four times the Number of small ones, which are but Trifles.

Before the Design of a *Garden* be put in Execution, it ought to be consider'd what it will be in twenty or thirty Years time, when the *Pallisades* are grown up, and the *Trees* are spread; For it often happens, that a Design, which looks handsome when it is first planted, and in good Proportion, becomes so small and ridiculous in Process of Time, that there is a Necessity either to alter it, or destroy it intirely, and so plant it anew.

The Corners and Angles of every Part of a *Garden* ought to be slop'd, or cut hollow: This will make the Cross-paths more agreeable to the Eye, and more convenient for walking, than to find Points and Corners advancing, which look very ill upon the Ground, and are very inconvenient.

The several Sorts of *Gardens* may be distinguish'd under three Heads: 1. *Gardens* on a perfect Level. 2. *Gardens* on an easy Ascent. And 3. *Gardens* whose Ground and Level are separated and interrupted by Falls and Terrasses, Banks, Slopes, Flights of Steps, &c.

Gardens on a perfect Level are the best, as well for the Conveniency of walking, as that their long *Allies* and Glades have no Risings nor Fallings, and are not so chargeable to maintain as the other.

Gardens on a gentle Ascent are not quite so agreeable and convenient, altho' the Shelving be so little as not to be perceiv'd; for it fatigues and tires a Person to walk either up Hill or down Hill, without finding scarcely a resting Place: These sloping Grounds are also liable to be spoil'd by Torrents.

There is a peculiar Excellency in *Gardens*, that have Terrasses; because from the Height of one Terrass, all the lower Parts of the *Garden* may be discover'd; and from others, the Compartiments are seen, which form so many several *Gardens* one under another, and present us with very agreeable Views, and different Scenes of Things, if the Terrasses are not too frequent, and there be good Lengths of Level between them.

These *Gardens* also lie advantageously for Water, which may be repeated from one another; but they are a great Charge to keep them up, as well as that they cost a great deal the making.

The general Distribution of a *Garden*, and of its Parts, ought to be accommodated to these different Situations: for an excellent Design which would be proper for a *Garden* that is flat and upon a Level, would not serve for a Ground cut asunder by divers Terrasses, which break off both the Level and the Continuity.

There are, besides these, many other Rules relating to the Proportions, Conformity and Place of the different Parts and Ornaments of *Gardens*; of which more may be seen under other Articles.

GENE-

GENERATION, is by Naturalists defin'd to be the Act of procreating and producing a Thing which before was not; or, according to the School-men, it is the total Change or Conversion of a Body into a new one, which retains no sensible Part or Mark of its former State.

Thus we say Fire is *generated*, when we perceive it to be where before there was only Wood and other Fuel; or when the Wood is so chang'd as to retain no sensible Character of Wood: In the like manner a Chick is said to be *generated*; when we perceive a Chick, where before was only an Egg, or the Egg is chang'd into the Form of a Chick.

In *Generation* there is not properly any Production of new Parts, but only a new Modification or Manner of Existence of the old ones; and thus *Generation* is distinguish'd from *Creation*.

Generation also differs from *Alteration*, in that in *Alteration* the Subject remains apparently the same, and is only chang'd in its Accidents or Affections; as Iron, which before was square, is now made round; or when the same Body which is well to Day, is sick to Morrow.

Again, *Generation* is the Opposite to *Corruption*, which is the utter Extinction of a former Thing; as when that which before was an Egg or Wood, is no longer either the one or the other: Whence it appears, that the *Generation* of one Thing is the *Corruption* of another.

The *Peripateticks* explain *Generation* by a Change or Passage from a Privation or Want of a substantial Form, to the having of such a Form.

The *Moderns* allow of no other Change in *Generation* than what is *local*, and according to their Notion, it is only a Transposition, or new Arrangement of Parts; and in this Sense, the same Matter is capable of undergoing an infinite Number of *Generations*.

As for Example; a Grain of Wheat being committed to the Ground, imbibes the Humidity of the Soil, becomes turgid, and dilates to such a Degree, that it becomes a *Plant*, and by a continual Accession of Matter, by Degrees ripens into an Ear, and at length into a Seed: This Seed, when ground in a Mill, appears in the Form of Flower, which being mixt up with Water, makes a Paste, of which *Bread* is *generated* by the Addition of Yest, and undergoing the Operation of Fire, *i. e.* by baking; and this Bread being communicated by the Teeth, digested in the Stomach, and convey'd through the Canals of the Body, becomes *Flesh*, or, in other Words, *Flesh* is *generated*.

Now the only Thing effected in all this Series of *Generation*, is a local Motion of the Parts of the Matter, and their settling again in a different Order: So that where-ever there is a new Arrangement or Composition of the Elements, there is in Reality a new *Generation*; and thus *Generation* is reduc'd to *Motion*.

Generation is more immediately understood of Animal and Vegetable Bodies from Seed, or the Coition of others of different Sexes, but of the same *Genus* or *Kind*.

Monf. *Perrault*, and some of the modern Naturalists after him, maintain'd, that there is not properly any new *Generation*; that God created all Things at first; and that what is by us call'd *Generation*, is no more than an Augmentation and Expansion of the minute Parts of the Body of the Seed: So that the whole Species which are afterwards produc'd, were in Reality all form'd at the first, and inclos'd therein, to be brought forth and exclos'd to View in Time, and according to a certain Order and Oeconomy.

And accordingly Dr. *Garden* says, It is most probable that the *Stamina* of all the Plants and Animals that have been or ever shall be in the World, have been form'd, *ab Origine Mundi*, by the Almighty Creator, within the first of each respective Kind: And he who considers the Nature of Vision, that it does not give us the true Magnitude, but only the Proportion of Things, and that which seems to our naked Eye but a Point, may truly be made up by as many Parts as seem to be in the whole Universe, will not think this an absurd or impossible thing.

Dr. *Blair*, treating of the *Generation* of *Plants*, says, That when Almighty God created the World, he so order'd and dispos'd of the *Materies Mundi*, that every Thing produc'd from it should continue so long as the World should stand; not that the same individual Species should always remain, for they were, in Process of time, to perish, decay, and return to the Earth from whence they came: But that every *Like* should produce its *Like*, every Species should produce its own Kind, to prevent a final Destruction of the Species, or the Necessity of a new Creation, in order to continue the same Species upon Earth or in the World.

For which End he laid down certain Regulations, by which each Species was to be propagated, preserv'd and supported, till in Order or Course of Time they were to be remov'd hence; for without that, those very Beings which were created at first, must have continu'd to the final Dissolution of all things, which Almighty God of his infinite Wisdom did not think fit.

But that he might still the more manifest his Omnipotence, he set all the Engines of his Providence to work, by which one Effect was to produce another by the Means of certain Laws or Rules laid down for the Propagation, Maintenance and Support of all created Beings: This his divine Providence is call'd *Nature*, and these Regulations are call'd the *Laws* or *Rules* of *Nature*, by which it ever operates in its ordinary Course; and whatever recedes from that, is said to be preternatural, miraculous, or monstrous.

Moses, in his Account of the *Creation*, tells us, that Plants have their Seeds in themselves, in these Words; *And God said, Let the Earth bring*

bring forth Grass, the Herb yielding Seed, and the Fruit-tree yielding Fruit, after his Kind, whose Seed is in itself upon the Earth.

The Ancients indeed distinguish'd the Generation of Animals into two Kinds, i. e. into Regular, call'd Univocal; and Anomalous, call'd also Equivocal or Spontaneous.

The first was effected by Parent Animals of the same Kind, as that of Men, Birds, Beasts, &c. The second they suppos'd to be effected by Corruption, the Sun, &c. As that of Insects, Frogs, &c. But this latter is now generally exploded.

Many, indeed, have essay'd to treat of the Generation of Animals, but few have been able to give that satisfactory Account of it that were to be wish'd for, and far fewer yet have been able to treat of the Generation of Plants so as it ought to be; for that which still kept them in the Dark, was,

1st, That though there were two different Sexes in Animals, by whose mutual Assistance the Species was propagated, yet there was no such thing then known in Plants.

2dly, That though it can now be made appear, that every Animal is produc'd by Univocal Generation, i. e. from an Egg, and not by Corruption, &c. as most of the Ancients imagin'd the Insects were, yet there are still those who maintain, that those which they call Imperfect Plants, are the Product of a certain Rottenness in the Earth.

The Generation of Plants bears a close Analogy to that of some Animals, especially such as want local Motion, as Muscles, and other immoveable Shell-fish, which are Hermaphrodites, and contain both the Male and Female Organs of Generation.

The Flower of a Plant is found to be the Pudendum, or principal Organ of Generation; but the Use of so much Mechanism, and so many Parts has been but little known.

The Flower of a Lily consists of six Petala, or Flower-leaves; from the Bottom of which, at the Middle, arises a kind of Tube, call'd the Pistillum; and pretty fine Threads, call'd the Stamina, are dispos'd around it: These Stamina are likewise from the Bottom of the Flower, and terminate at the Top in little Bunches call'd Apices, which are replete with a fine Dust call'd Farina.

This is the general Structure of the Flowers of Plants, although they are infinite Ways diversify'd, and to such a Degree, that some have no sensible Pistile, and others want the Stamina; others again have the Stamina, but want the Apices; and some Plants exceed all others in this, that they have no Flowers: But if it be allow'd, that this before-mention'd be the most common Structure of Flowers, it will follow, that these Parts that seem wanting are usually only less apparent.

The Fruit is usually at the Base of the Pistillum, so that when the Pistillum falls with the rest of the Flower, the Fruit appears in the stead of it: But oftentimes the Pistillum is the Fruit itself: but still they have both the same Situation in the Center of the Flower,

and the Petala or Flower-Leaves, which are dispos'd around the little Embryo, seem to be design'd only to prepare a fine Juice in the little Vessels for the Support of it during the little time that they last and it requires; but some suppose the chief Use of them to be to defend the Pistillum, &c.

The Apices of the Stamina are small Capsula or Bags full of a Farina or Dust, which falls out when the Capsula grows ripe and bursts.

Monf. Tournefort suppos'd this Dust to be only an Excrement of the Food of the Fruit, and the Stamina to be but only excretory Dusts, which filtrated this useless Matter, and thus discharg'd the Embryo: But Mr. Morland, Mr. Geoffroy, and others, find nobler Uses for this Dust. On their Principle, the Stamina, with the Apices and Farina, make the Male Part of the Plant, and the Pistil, the Female.

Mr. Morland says, It hath been long ago observ'd, that there is in every particular Seed a Seminal Plant conveniently lodg'd between the two Lobes, which constitute the Bulk of the Seed, and are design'd for the first Nourishment of the tender Plant.

But the admirable Dr. Grew, to whose generous Industry and happy Sagacity we are indebted for the best Improvements of this Part of Knowledge, is the only Author I can find, who hath observ'd, that the Farina or fine Powder, which is at its proper Season shed out of those Theca or Apices seminiformes [i. e. Seed-forming Cases] which grow at the Top of the Stamina, doth some way perform the Office of Male Sperm. But herein, I think, he falls short, in that he supposes them only to drop upon the Outside or Uterus, or Vasculum Seminale, and to impregnate the included Seed by some spirituous Emanations or energetical Impress.

That which is now subjected to the Disquisitions and Censure of such whose exquisite Skill doth constitute them Judges of such Performances, is, whether it be not more proper to suppose that the Seeds which come up in their proper Involucra, are at the first an unimpregnated Ova (or Eggs) of Animals; that this Farina is a Congeries of seminal Plants, one of which must be convey'd into every Ovum before it can become prolific: That the Stylus, in Mr Ray's Language; or the upper Part of the Pistillum, in Mr. Tournefort's, is a Tube design'd to convey these seminal Plants into their Nest in the Ova: That there is so vast a Provision made, because of the Odds there are, whether one of so many shall ever find its Way into and through so narrow a Conveyance.

To make this Supposition the more credible, I shall lay down the Observations I have made upon the Situation of these Stamina and the Stylus in some few Species of Plants.

First, in the Corona Imperialis, where the Uterus or Vasculum Seminale of the Plant stands upon the Center of the Flower, and from the Top of this ariseth the Stylus, the Vasculum Seminale

Seminale and *Stylus* together representing a *Pistillum*.

Round this are planted six *Stamina*; upon the Ends of each of these are *Apices* so artfully fix'd, that they turn every Way with the least Wind, being in Height almost exactly equal to the *Stylus* about which they play, and which in this Plant is manifestly open at the Top, as it is hollow all the Way: To which we must add, that upon the Top of the *Stylus* there is a Sort of Tuft consisting of *Pinguid Villi*, which I imagin'd to be plac'd there to catch and detain the *Farina* as it flies out of the *Theca*; from hence, I suppose, the Wind shakes it down the Tube, till it reach the *Vasculum Seminale*.

In the *Caprifolium* or *Honey-suckle*, there rises a *Stylus* from the Rudiments of a Berry, into which it is inserted to the Top of the *Monopetalous* Flower; from the Middle of which Flower are sent forth several *Stamina*, that shed their *Farina* out of the Cases upon the Orifice of the *Stylus*, which in this Plant is villous or tufted, upon the same Account as in the former.

In *Allium* or common *Garlick*, there arises a *Tricoccos Uterus* or Seed-Vessel; in the Centre of which is inserted a short *Stylus*, not reaching so high as the *Apices*, which thus overtopping it, have the Opportunity of shedding their Globules into an Orifice more easily: For which Reason I can discern no Tuft upon this (as in the former) to insure their Entrance that being provided for by its Situation just under them.

The Reader, I hope, will excuse me, if I present him now with some such Reasonings or Reflexions as the foregoing Account doth suggest and will support; and I can't but hope to persuade those that are candid, that I have assign'd to the several Parts of the Flowers I have mention'd, their true and real Use.

For nothing can be more natural than to conclude, that where a fine Powder is curiously prepar'd, carefully repositied, and shed abroad at a peculiar Season, where there is a Tube so planted as to be fit to receive it, and such Care in disposing this Tube, that where it doth not lie directly under the Cases that shed the Powder, it hath a particular Apparatus at the End to insure its Entrance.

Nothing can be more genuinely deduc'd from any Premises than it may from this, that this Powder, or some of it, was design'd to enter this Tube. If these *Stamina* had been only excretory Ducts, as has been hitherto suppos'd, to separate the grosser Parts, and leave the Juice design'd for the Nourishment of the Seed more reserv'd, what need was there to lodge these Excrements in such curious Repositories? They would have been convey'd any where, rather than where there was so much Danger of their dropping into the *Seed-vessel* again, as they are here.

Again, the Tube over the Mouth of which they are shed, and into which they enter, leads always directly into the *Seed-vessel*.

To which we must add, that the Tube always begins to die when these *Thecae* are empty'd of

their Contents; if they last any longer, it is only whilst the Globules, which enter at their Orifice, may be suppos'd to have finish'd their Passage: Now, can we well expect a more convincing Proof of these Tubes being design'd to convey these Globules, than that they wither, when there are not more Globules to convey?

If I could now shew, that the *Ova*, or unimpregnated Seed are ever to be observ'd without this *Seminal Plant*, the Proof would arise to a Demonstration; but having not been so happy as to observe this, I shall content myself at present with suggesting, that hence one would conclude, that the *Petala* of the Flower were rather design'd to sever superfluous Juices from what was left to ascend in the *Stamina*, than the *Stamina* to perform this Office, either for them or the unimpregnated *Semina*, and observe the Analogy between *Animal* and *Vegetable Generation*, as far as was necessary there should be an Agreement between them. I shall recommend the Inquiry to those Gentlemen who are Masters of the best Microscopes, and Address in using them; tho', in the mean time, I have made some Steps towards a Proof of this Sort, and have met with some such Hints, as make me not despair of being able, in a short time, to give the World even this Satisfaction.

For not to insist upon this, that the *Seminal Plant* always lies in that Part of the Seed which is always nearest to the Insertion of this *Stylus*, or some Propagation of it into the *Seed-vessels*, I have discover'd in *Beans*, *Peas* and *Phascols*, just under one End of what we call the Eye, a manifest Perforation, (discernible by the grosser Sort of magnifying Glasses) which leads directly to the *Seminal Plant*, and at which I suppose the *Seminal Plant* did enter; and I am apt to think, the *Beans* or *Peas* that don't thrive well, may be found destitute of it.

But I must now proceed to describe some other Plants, whereby it will appear, that there is a particular Care always exercis'd to convey this Powder, so often mention'd, into a Tube, which may convey it to the *Ova*.

Now in *Leguminous Plants*, if we carefully take off the *Petala* of the Flower, we shall discover the *Pod* or *Siliqua* closely cover'd with an involving Membrane, which about the Top separates into several *Stamina*, each fraught with its Quantity of *Farina*; and these *Stamina* are closely bound upon the Brush, which is observable at the End of that Tube, which here also leads directly to the *Pod*: it stands not upright indeed, but so bended as to make near a right Angle with it.

In *Roses* there stands a Column, consisting of many Tubes closely clung together, though easily separable, each leading to their particular Cell, the *Stamina* in a great Number planted all round about.

In *Tithymalus* or *Spurge*, there rises a *tricoccos Vessel*, that whilst it is small, and not easily discernible, lies at the Bottom till it is impregnated; but afterwards grows up, and stands so high upon a tall Pedicle of its own, as would tempt one to think, that there were to be no Communion betwixt this and the *Apices*.

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In the *Straw-berries* and *Rasp-berries*, the Hairs which grow upon the ripe Fruit (which I suppose may be surprizing to some) are so many *Tubes*, leading each to their particular Seed, and therefore we may observe, that in the first opening of the Flower, there stands a Ring of *Stamina* within the *Petala*, and the whole inward *Area* appears like a little Wood of these Hairs or Pulp; which when they have receiv'd and convey'd their *Globules*, the Seeds swell and rise in a carneous Pulp. Thus far Mr. Morland.

We may observe a Vessel at the Bottom of the *Pistil* of the *Lilly*, which Vessel we may call the *Uterus* or *Womb*; in which are three *Ovaries* fill'd with little Eggs or Rudiments of Seed found in the *Ovaria*, which always decay and come to nothing, unless impregnated with the *Farina* of the same Plant, or some other of the same Kind: The *Stamina* also serves for the Conveyance of the Mail Seed of the Plant to be perfected in the *Apices*; which when ripe, burst forth in little Particles like Dust: Some of them fall into the Orifice of the *Pistil*, and are either convey'd thence into the *Utricle*, to fecundify the Female *Ova*, or lodg'd in the *Pistil* where, by their magnetick Virtue, they draw the Nourishment from the other Parts of the Plant into the *Embryo's* of the Fruit, making them swell, grow, &c.

In Flowers that turn down, as the *Cyclamen* and the *Imperial Crown*, the *Pistil* is much longer than the *Stamina*, that the Dust may fall from their *Apices* in sufficient Quantities on the *Pistil*, for the Business of Impregnation.

Mr. Geoffroy assures us, that in all the Observations he had made, the cutting off the *Pistil* before it could be impregnated by the *Farina*, actually render'd the Plant barren for that Season, and the Fruit abortive.

In many kinds of Plants, as the *Oak*, *Pine*, *Willow*, &c. the Flowers, Mr. Geoffroy observes, have their *Stamina* and *Apices*, whose *Farina* may easily impregnate the Rudiments of the Fruit, which are not far off.

Indeed there is some Difficulty in reconciling this System with a certain Species of Plants, which bear Flowers without Fruit; and another Species of the same Kind and Denomination, which bear Fruit without Flowers; such are the *Palm*, *Hemp*, *Hop*, *Poplar*, &c. which are hence distinguish'd into *Male* and *Female*: For how should the *Farina* of the Male here come to impregnate the *Ova* of the Female?

This Difficulty Mr. Geoffroy solves, by supposing the Wind to be the Vehicle that conveys the Male Dust to the Female *Uterus*; which is confirm'd by an Instance of *Jovianus Pontanus*, of a single Female *Palm-Tree* growing in a Forest, which never bore Fruit, till having risen above the other Trees of the Forest, and being then in a Condition to receive the *Farina* of the Male by the Wind, it began to bear Fruit in abundance.

As to the Manner wherein the *Farina* fecundifies, Mr. Geoffroy advances two Opinions:

1st, That the *Farina* being always found of a sulphureous Composition, and full of subtil

and penetrating Parts, (as appears from its sprightly Odour) which falling on the *Pistils* of the Flowers, there resolves, and the subtlest Parts of it penetrating the Substance of the *Pistil*, excite a Fermentation, which putting the latent Juices of the young Fruit in Motion, occasions the Parts to unfold the young Plant that is inclos'd in the *Embryo* of the Seed.

In this Hypothesis, the Plant in Miniature is suppos'd to be contain'd in the Seed, and to want only a proper Juice to unfold its Parts, and make them grow.

The second Opinion is, That the *Farina* of the Male Plant is the first Germ or Semen of the new Plant, and stands in need of nothing to enable it to grow or unfold, but a suitable *Nidus* with the Juice it finds prepar'd in the *Embryo* of the Seed or Ovary.

It may be observ'd, that these two Theories of *Vegetable Generation* bear a strict Analogy to those two of *Animal Generation*, viz. either that the young Animal is in the *Semen Masculinum*, and only stands in need of the Juice of the Matrix to cherish and bring it forth; or that the Female *Ovum* contains the Animal, and requires only the Male Seed to excite a Fermentation.

Mr. Geoffroy rather takes the proper Seed to be in the *Farina*; inasmuch as the best Microscopes don't discover the least Appearance of any Bud in the little *Embryo's* of the Grains, when they are examin'd, before the *Apices* have shed their Dust.

In Leguminous Plants, if the *Petala* and *Stamina* be remov'd, and the *Pistil*, or that Part which becomes the Pod, be view'd with the Microscope before the Flower be open, those little, green, transparent *Vesiculae*, which are to become Grains, will appear in their natural Order, yet still shewing nothing else but the mere Coat or Skin of the Grain.

If you continue to observe the Flowers as they advance for several Days successively, you'll find them to swell, and by degrees to become replete with a limpid Liquor; in which, when the *Farina* comes to be shed, and the Leaves of the Flower to fall, there may be observ'd a little greenish Speck or Globule floating about at large.

There is not at first any Appearance of an Organization in this little Body; but in time, as it grows, you may begin to distinguish two little Leaves like two small Horns: As the little Body grows, the Liquor diminishes insensibly, till at length the Grain becomes quite opaque; and upon opening it, the Cavity will be found fill'd with a young Plant in Miniature, consisting of a little Germ or *Plantula*, a little Root, and the Lobes of the *Bean* or *Pea*.

The Manner wherein this Germ of the *Apex* enters the *Vesicula* of the Grain, is not very difficult to determine: For besides, that the Cavity of the *Pistil* reaches from the Top to the *Embryo's* of the Grains, those Grains or *Vesiculae* have a little Aperture corresponding to the Extremity of the Cavity of the *Pistil*, so that the small Dust or *Farina* may easily fall, or find an easy Passage into the Aperture in the

the Mouth of the Vessels, which is the Embryo of the Grain.

This *Aperture* or *Cicatricula* is much the same in both Grains, and it is easily observ'd in *Peas*, *Beans*, &c. without a Microscope.

The Root of the little Germ is just against this *Aperture*, and it is through this it passes out when the little Grain comes to germinate.

Dr. Patrick Blair, treating of the *Generation of Plants*, says, That a Vegetative Life is common to them, as well as *Animals*; and that the Propagation or Production of the Species is the Effect of the *Vegetative*, not the *Sensitive* Life in *Animals*, as well as in *Plants*; and that if there be a Necessity of the Concurrence of two different Sexes in *Animals*, at the Begetting or Generating of the Species, the same Necessity must be in *Plants* too: For as a Cow, a Mare, a Hen, a She-Reptile, an Insect, &c. cannot produce an Animal without the Male; no more can it be suppos'd that a Plant can produce fertile Seed without the Concurrence of the Male Plant, or the Male Parts of the Plant.

Mr. Ray says, That he will not deny that both Trees and Herbs may produce Fruit, and even come to Maturity, without the Male Seed being sprinkled upon them. For though most Birds do not lay Eggs without Congress of the Male, yet the Hen often does it without copulating with the Cock; but then these Eggs are barren and Wind-Eggs. Just so, tho' a Female Plant may produce Seed of it self, yet that Seed is never fertile. For,

1st, As the Work of *Generation* in *Animals* does not proceed from their Animal or Sensitive Life, but from their Vegetative, which being the same as in *Plants*, that Operation must be perform'd after the same Manner in both: Therefore, as there is a Necessity of two different Sexes in *Animals*, it must be so too in *Plants*.

2dly, As Passive Seminal Matter in Female *Animals* cannot be productive or fertile of it self, without being impregnated, animated, or its Particles set in Motion and dilated by the active Principles of the Male Seminal Matter; neither can the Female Seed in *Plants* be render'd fertile, until it be impregnated by the *Farina Fecundans* from the Male Parts of the Plants.

As to the Flowers of Plants, if they were not assisting to, or if there were not some extraordinary Use from them in the Perfection of the Seed, they would not be so often observ'd upon Plants as they are. But since there is no Fruit or Seed without a previous Flower; and since where the one is obvious, the other is conspicuous; and since one is scarce to be observ'd with the naked Eye, neither is the other: this implies a Relation between them, that the one of them is not to be expected without the other.

It is true, there may be Flowers upon a Plant, where the Fruit is seldom or never seen, especially in these Northern Climates, such as the *Pervinca*, the *Nymphaea alba minima*, and several others, where the Plant exhausts the Nutritious Juice in pushing forth

Tendrils, or upon a Running Root, which is so weaken'd as not to be able to bring the Fruit to Perfection: but there is no Fruit or Seed to be seen, unless a Flower has been sent as a Messenger before it, to give Notice of its Approach; though it is not always upon the same Plant, yet is still upon some other Plant of the same Species; for the Flowers are to be seen upon distinct Plants, different Branches, or different Parts of the Branch from the Fruit, in the *Abies*, *Corylus*, *Nux Juglans*, &c. the *Mercurialis*, *Spinachia*, &c.

But the Fruit never appears, or never begins to increase upon these Plants, 'till the Flower is spent and gone; therefore they must serve for another Use, than to be merely ornamental: for if that were their principal Use, they would be always conspicuous, which they are not, for the most part, in Apetalous Flowers; and they should always be to be seen, and never be hid: which is not so in the *Asarum*, *Hydrocoryle*, &c. where, tho' the Flower is large enough in Proportion to the Fruit, yet it is not to be seen unless the Leaf be turn'd up, and both Flower and Fruit be narrowly search'd for.

The *Frumenta* and *Gramina* have their Staminate Flowers; yet in some of them the Flower is seldom to be seen, unless the Spike be shaken, and then the *Apices* will appear.

The *Polypodium* and other Capillary Plants have regular Flowers, which precede the minute Capsule or Seed-Vessels; but neither of them are conspicuous without a Microscope.

From these Instances it appears, that Flowers are not constantly a Guard to preserve the tender Embryo's from the Injuries of the Air; for then the Flowers must always have been upon the same Pedicle with the Fruit.

Therefore, since the Appearance of the Flower is the first Step towards the Production of the Seed, whether both be upon the same Pedicle or not, it necessarily follows, that the one must contribute towards the bringing of the other to Perfection.

The Antients taking Notice, that several Plants did produce Flowers and had no Seeds, and that other Plants of the same Species, and sown from the same Seed, did produce the Seed without a previous Flower, they were ready to call the one *Male*, and the other *Female*, without any Notion that the one was assisting to the other; for they look'd upon such Flowers to be only barren; and therefore they call'd those which had Flowers *Female*, and those that produc'd the Fruits *Male* Plants. Thus *Mercurialis* is call'd *Spicata Fœmina*, and *Testiculata Mas*. That which produces the Fruit must needs be the *Female*, as the Female Animal brings forth the *Fœtus*; and so the *Testiculata* must needs be the *Female*, and the *Spicata* the *Male*.

Where-ever the Plants are Annual, these, with the Flowers, and such as have the Seed, are always near to each other; but where the Root is Perennial, and where the Plant is more frequently propagated by the Root than the Seed, the Case alters: for there being no need

need of the Seed to propagate the Plant, there is the less need of the Flower to be nearer to the Plant which produces the Seed.

So the *Bryonia* and the *Lupulus* are frequently seen to grow, the one to produce the Berry, and the other the *squamosa* Fruit, when the Plants which produce the *Male Flowers* of the one or the other are at a great Distance. And this is so far from being an Objection against the Necessity of two Sexes in Plants, as well as in Animals, that it is an Argument to confirm it; for it shews the wonderful Contrivances in order to preserve the Species, when the ordinary Means of propagating it by the Seed cannot be so conveniently attain'd.

These, and more that might be produc'd, being evident Proofs of two Sexes in Plants, as well as in Animals, we shall, in the next Place, give some Experiments to confirm this in a Negative Way, as has been already done in a Positive.

When Plants have been depriv'd of their *Male Flowers*, or *Male Parts* in the Flower, they either produc'd no Seed at all, or, if they did, they became abortive, dry'd up, or dwindled away; or, though the Seeds did come to Perfection, they were barren, or did not produce.

Experiment 1st, Mr. *Geoffroy* having cut off all the staminate Tufts of *Male Flowers* from the Top of the Stalk in the *Mayze* or *Turkey Wheat* as soon as they appear'd, and before the Spike loaded with the *Embryo's* of the *Semen* had put forth from the *Axils* of the Leaves, several of these *Embryo's* decay'd and dry'd up after they were pretty big; but some Grains upon their Pedicles all along the Spike swell'd considerably, and seem'd to be full of the Bud, and were consequently fertile, while all the others miscarry'd, and there was not one Spike where the whole Seeds did ripen to the full.

This *Experiment* is a sufficient Proof of the Use of the *Male Flowers* in this Plant; for whatsoever that is which flows from the *Raceme* of these *Flowers*, it seems it must be conducive not only for the Impregnation of the Seed, but also for the Growth and Impregnation of the *Fruit*.

At present we shall shew, that what Nourishment is usually furnish'd by the Pedicle to the *Embryo's*, does not appear to be capable to dilate or expand itself, or contribute to the continual Supply of Nutritious Particles, unless the *Embryo's* were animated or enliven'd by the Spirit, which should have flow'd from the *Male Flowers*; so that they were so debilitated and weaken'd, in ascending from the Body of the Plant towards the *Embryo's* before they could arrive at them, that they which otherwise might have serv'd for the Augmentation and Increase of all the *Embryo's* upon the Spike, could not now do any thing more than contribute to the ripening of a few. And altho' Mr. *Geoffroy* might have imagin'd that these few Seeds which came to Perfection were fertile also, because they were full of Buds; yet he could not be sure of that, unless

he had sown the same Seeds next Season, and try'd whether they would chit or not.

Gardeners who buy *Onion* and *Leek-Seed* brought from *Strasbourg*, commonly try the following Experiment: They put a few of the Seeds into a Pot of Water mixt with Earth, and if they find they begin to spring or send forth the Seminal Leaf or Fibre of the Root, after a few Days they judge of the Product of it: and notwithstanding all the Seeds, without this Trial, may seem to be productive, being equally firm, hard and solid, perhaps not more than one-third of them will prove fertile.

And this Barrenness may proceed, either because they had never been impregnated by the *Male Parts* of the Flower, or that they had been too much expos'd to the Air, being some time or other too much moisten'd, and not afterwards been carefully dry'd, or have been kept too long, by which Neglect they lose their Spirit or Life.

Now, if the Fullness, Solidity, and Firmness of a Seed is not a sure Sign of its Fertility, then Mr. *Geoffroy* might have been mistaken in his Opinion of the Fertility of these Seeds in the *Mayze*; since he did not make any Trial of it, by committing it to the Ground.

In like manner, as to his 2d *Experiment* of the *Mercurialis Dioscorides*, where he rais'd some Stalks which had the Fruit, and others which had the staminate Flowers, and remov'd the floriferous Stalks before the Flowers were blown, every one of the Seeds upon the fructiferous Plants, except five or six, miscarried; which Seeds were so full, that he was persuaded they were capable of producing new Plants: And the like was found by *Camerarius* in the *Cannabis*. Yet inasmuch as neither of them try'd the Experiment, by sowing the same Seed the second Year, they could not be sure but that they might have fail'd in their Expectation.

Mr. *Bobart* Overseer of the *Physick-Garden* at *Oxford*, about forty-eight Years since, which was before the Doctrine of the different Sexes of Plants was well understood, being a Herborizing, found a Plant of the *Lychnis Sylvestris Simplex*, whose Flowers, tho' they had *Stamina*, had no *Apices*; and taking notice that this was not only in one, but in all the Flowers upon the same Plant, he imagin'd it might be a new Species, and therefore mark'd the Plant, and took care to have it preserv'd 'till the Seeds were ripe; and then they being full, hard and firm, and, to outward Appearance, full of Germ, he sow'd them in a proper Place in the Garden the next Season; but not a Plant sprung up from them.

These, and other Instances, sets the Opinion of the different Sexes of Plants upon another footing than has been receiv'd by most of our modern Authors: For it imports, that it is not the Nourishment of the gross Substance of the Seed itself which is hereby meant, nor the Increase of the Seed-Vessel which is thereby design'd; for (as is already observ'd) a Hen can lay an Egg, without having before had Congress with a Cock; and this, when

when newly laid, shall be of the same Bigness, Colour, Taste and Smell with another Egg which has been Cock'd (as they call it) *i. e.* which has been fecundated by the Masculine Seminal Materies: but the Difference will appear, when both are put under the Hen, in order to be hatch'd; for the one shall pululate or chitt, and the other shall become foetid and rot.

The Case is just the same with the Seed of a Plant; it may be augmented and increased in its Bulk; it may become firm, hard and solid, and have all the Tokens of a perfect Ripeness, the Seed-Vessels may be enlarg'd, and the Pulp or *Parenchyma* of the Fruit may be augmented; and yet the Particles of the Seed may remain crude, indigested, and incapable to be explicated and dilated, or set in a suitable Motion, whereby to protrude the Fibrilla of the Root at one End, and the Seminal Leaves at the other; except it has before receiv'd some Extraneous Matter or some Active Particles from the Male Parts of the Flower, or from the Male Flower it self.

In order to confirm the Necessity of two Sexes of Plants, as well as in Animals, this familiar Consideration may be added; That the Fertility or Barrenness of any Tree, in the more or less fruitful Seasons, may be known, to ignorant or less-curious Persons, by the Quantity of the Flowers which appears in the Spring-time, and that not only in Trees alone, where the Flower and Fruit are upon one and the same Foot-stalk, but also in such Trees where the Flowers are upon distinct Trees, or separate Places upon the same Tree: For it is easy to determine, by the *Katkins* or *Juli* upon the *Walnut*, *Filbert*, or *Hazel-trees*, whether such or such Trees will be fertile or barren for the ensuing Season, before any of the Embryo's begin to break, be push'd forth, or appear.

Having already treated of the *Male* and *Female Parts* of Flowers, we shall next consider their *Use*.

Flowers in this respect, may aptly be divided into that of *Male Flowers*, which (as has been before observ'd) were formerly reputed barren; and the Plants which produc'd them were also call'd *Female Plants*, because those Persons not having any Notion of different Sexes in Plants, they were call'd *Female*, upon Account of their Weakness; or if they had any Thought of Sexes in them, it was only allusive.

The Antients were ignorant of those which are now-a-days call'd *Hermaphrodite Flowers*; and they not having a true Notion of Sexes of Plants, could not imagine that the Parts of both Sexes should be in one Flower, upon one and the same Foot-stalk.

And altho' *Hermaphrodite Animal* bear the least Proportion in the Animal Kingdom, yet *Hermaphrodites* have the greatest Share in the *Vegetable*: tho' they are not so numerous as they have been suppos'd to be: for, upon a strict Examination, it will be found, that a great many more Plants have distinct Male

and Female Flowers, than was formerly believed.

The Necessity of different Sexes in Plants having been demonstrated, and that the Female Seed, tho' it should ripen to the full, cannot be fertile, except it be impregnated by what it receives from the Male Parts of Flowers; we shall next explain the Organs of Generation in both Sexes.

In the *Animal Oeconomy*, there are, besides those Vessels that are destinated for Nutrition and the Secretion of the several Juices in the Body, *Spermatick Vessels*, which consist of *Praparantia*, *Deferentia*, and *Contentia Semen*. The *Praparantia* in Males are the Blood-Vessels and the *Testes*: The one conveys the Blood; and the other separates the *Semen* from Blood, and elaborates it.

So likewise in *Plants* there are Vessels that receive the Nutritious Particles from the Earth and convey it to the Extremities of the Plant; some of which tend directly to the Leaf, and others to the Flowers.

Those which go to the Foot-stalk of the Flower may not improperly be call'd *Spermatick Vessels*; for 'tis from them that the Seminal Particles in *Male*, *Female*, and *Hermaphrodite Flowers* are separated: therefore the Foot-stalks of the *Hermaphrodite Flowers* are proportionably larger than those either of the *Male* or *Female*; they have a double Office, and contribute successively to both.

In those where the *Calix* becomes the Fruit, the greatest Supply is furnish'd to it first, and distributed in its Cortical Parts; as is visible in the *Rose*, in which the Foot-stalk is so far enlarged at first, as to be of an equal Bigness with the Bud.

After the *Calix* is thus form'd, the next Distribution is to the Inner or Centrical Part of the Flower, which *Dr. Grew* calls *Attire*, and where the *Pistillum* becomes the Fruit; the *Pistillum* and *Stylus* is form'd at the same time with the *Stamina* and the *Apices*.

The *Stylus* at the very first acquires both its due Length and Bigness; for the Nutritious Particles ascending in the Centre, never stop 'till the *Stylus* is stretch'd out to its full Length; and in such as are furnish'd with a peculiar *Apex*, that is form'd first: The Neck of the *Stylus*, or that Part next to it, is the biggest; from thence it gradually decreases in its Grossness, 'till it comes to the *Pistillum*. This is easily perceiv'd by those who will take the Pains to open the Bud of a *Lily*, *Tulip*, &c. before they are half blown.

The *Stamen* is furnish'd next with an extraordinary Supply of the Nutritious Particles before the Flower is blown: These, whether fewer or more, are at first brought to their proportional Largeness, being round and juicy.

The *Apex* is the third which receives this extraordinary Supply of the Nourishment; for after that the *Stylus* is form'd, that it may lean to it after the Vessels of the *Stamen* are extended to their full Length, and so form'd that they can convey such an extraordinary Quantity of Particles as may fill up the Capacity of the *Apex*, it is then more enlarg'd than ever

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after; for if the Flower of a *Lilly* be opened before it be blown, the *Apex* will be found to be full as long as the *Stamen*, for as the one half of the *Apex* covers the *Stamen*, fixed to its Centre, so the other half of it is so far extended above the *Stamen*, as the *Stamen* remained uncovered below it, towards the Pedicle or Foot-stalk.

The fourth Part of a Flower, is the *Petala*, which receives this extraordinary Supply of Nourishment before the Blowing: These upon the Reverse, are first enlarged towards the Pedicle, and are afterwards extended and stretch'd forth in Proportion to the Enlargement of the *Attire*; at first they are all grosser and more succulent towards the Origin, and gradually become thinner and broader. The *Stamina* of Monopetalous Flowers do, for the most Part, arise partly from the *Petalon* itself, and partly from the *Calix*; especially if the *Stamina* correspond in Number to the *Petala*, as in the *Hexapetala*, or *Polypetala Liliacea* of *Tournefort*, where every *Stamen* arises opposite to the Middle of the *Petalon*.

This Observation (how and when, this more than ordinary Supply of Nourishment is carried to the Flowers) easily demonstrates wherein the Analogy of the Organs of Generation in *Plants* and *Animals* consists.

In *Animals*, the Seminal Matter is received by proper Vessels from the same Blood from whence the other Secretions fit for the Preservation of the Animal Oeconomy, proceed; so that the Blood in *Animals* being the same with the Sap in *Plants*, and both being convey'd after the same Manner, throughout the several Bodies, it necessarily follows, that the one as well as the other, must have proper Vessels for Secretion of the Seminal Matter.

Let it then be consider'd, That the Sap or nutritious Juice ascends in common to the *Pedicle* of the Flower, as the Blood flows by the *Aorta descendens*, and that at the *Calix* or Bottom of the Flower, some Share goes to one Part of it, and some to another; as the *Aorta* sends one Branch to the *Spermatick* Vessels, and the Remainder of it goes to perform the other Functions: and as a Part of the Sap is separated by the *Pedicle* of the Flower, when the Remainder is distributed throughout the remaining Parts of the Plant; so the *Arteria præparans* goes directly to the *Testes* in the Male, and *Ovarium* in the Female: And in Flowers, some Vessels tend directly to the *Calix* (if it becomes the Fruit or to the *Perianthium* (if there be any) some to the *Petala*, some to the *Stamina*, some to the *Pistillum* or *Uterus*, as it is called by *Malpighius*.

These Things being seriously reflected on, we must of necessity conclude,

1. That the same due Care is taken to elaborate and prepare the most subtle and impenetrable Particles of the nutritious Juice in *Plants*, as of the Blood in *Animals*.

2. This Substance so prepared, as it must be designed for some extraordinary Use, so this Use can be no other than that of being

the Means of fecundating the Female Seed in *Plants*, as the other is of the Feminine *Ova* in *Animals*.

If any one shall take a Flower full blown, and pull one of the *Stamina* from the *Pedicle*; he will find a rough, viscid Liquor, like to the *Sperma*, which remains here till its most subtle Parts have either ascended the *Stamen*; or, perhaps, the more gross Particles might have remain'd there, after the most subtle had ascended, before the Flower was blown: This is as plain and demonstrable as can be in the *Lillies*; and in the *Orange Lilly*, and most of the *Martagon Lillies*, there is a Contrivance more obvious.

This viscid Liquor ascending by parallel Ducts to the *Apex*, there this subtle Matter is retain'd, till it is farther elaborated by the Evaporations of the more humid and aqueous Particles, by the Heat of the Sun, and then it becomes a most subtle, fine, impalpable Dust, which is then said to be ripe, and is called the *Farina*.

Dr. Blair, after having given the Sentiments of Seven different Authors upon the Subject, proceeds to give his own, without subscribing to the Sentiment of either the one or the other; and endeavours by a strict Examination of the Flowers themselves, to find out which of these two Opinions, so diametrically opposite to each other, are most agreeable to Fact.

But before he begins, he lays down this general Maxim, which he takes for granted. That *Nature is uniform in all her Operations, and never recedes from those Rules laid down by the Wise Disposer of all Things at the Creation, by performing the same Thing after two different and contrary Methods*, and thence concludes, That if the *Farina* be a Congeries of Seminal Plants in one Species, it must be so in all.

If there be an open and direct Passage; or though it be not so direct, yet, if by any indirect Passage, by which it can be demonstrated, that one single Grain of the *Farina* can enter every individual Seed in one Plant, it must be so in all; but if neither of these hold good, and if it can be proved by ocular Inspection, without the Assistance of a Microscope, in those very Plants exemplified by Mr. Morland, Mr. Geoffroy and Mr. Bradley, that the *Farina* in Substance, cannot enter the Seminal Vessel: or if it does, that there is no direct Passage for it to enter each particular Seed, after it has got into the *Capsula* or *Siliqua*, then he hopes, both their Queries, Suppositions, and Assertions must fall.

As for the *Corona Imperialis*, the first Example given by Mr. Morland, the Flower of which hangs downwards; tho' he does not deny but its *Stylus* may be hollow all the Way, and that it may open at the Extremity, yet by its Situation and several other Circumstances, it does not seem to him to favour this Opinion.

For, 1. as there is a continual Conflux of Particles through the Skin in Animal Bodies, it is also so in Vegetables; this appears by the

the immediate fading of Flowers, or any other Part of a Plant, after it has been pluck'd off; which proceeds from the Evaporation of the Particles in the little Tubes, without any more succeeding in their Place.

He thinks it as reasonable to suppose, that these Particles flow out by the hollow *Stylus*, as by any other Part, and also more sensibly there than elsewhere, because of their being concentrated within such narrow Bounds; and that if these Particles descend by the *Stylus* hanging downwards, the Particles, or rather Grains of the *Farina* can never ascend that same Way.

2. That if it should be granted, that these Grains did ascend by the *Stylus*, how do they get into the Seminal Vessel? That being closely shut up, as will appear to any one who shall observe it.

3. Whereas Mr. Morland supposes, That the Rain either washes it, or the Wind shakes it down the Tube, till it reaches the Seminal Vessel; Dr. Blair observes; that the Extremity, which is the upper Part of the *Stylus* in an erect Flower, must be the lower in a dependent one; so that if either the Rain or Wind have Access to it, it must necessarily either wash or drive it away from the Seminal Vessel, which is now the *Stylus*.

But here the Doctor takes notice of another Contrivance for answering that Purpose, *i. e.* a Sort of a *Pelvis* or *Cistern*, situated at the Origin or Root of each *Petalon*, filled with a viscous Liquor, which continues there, and never exceeds its Bounds, so long as the *Petalon* is in Health: For since the Apices are here so artfully fix'd, that they turn every Way with the least Wind, as Mr. Morland rightly observes, when they burst, and the *Farina* is driven to and fro, though it cannot so easily enter the Tube, yet it may conveniently be blown up towards the Orifice of the *Petala* surrounding the *Stylus*, where it is stopped or staid by this Viscosity till it has performed its Office.

To confirm this, he instances Mr. Fairchild who, he says, being persuaded that this viscous Liquor did some way or other contribute towards the Fructifying of this Plant; but not understanding how it did so, he tried the Experiment, by wiping this Liquor off as soon as it was deposited in the *Pelvis*, and the Flower which he so served did not bear any Fruit.

And the Way the Doctor accounts for this, is, that the Humidity being removed, the *Farina* is no sooner blown upwards, than it immediately falls down, without producing any Effect; and that which he takes to be a Confirmation of this, is, that both *Tulips* and *Fritillaria's* have this *Pelvis* or *Bason*, yet it is for the most part dry and empty; because their Flowers being erect, especially the former, they have no such need of this Liquor to retain the Dust; for that the Rain having immediate Access to them, may wash the Dust towards the Origine of the *Petala*, where it can remain till it has perform'd its Office; whereas the Rain having no Access to the inner Surface of the Flower of the *Corona*

Imperialis, it is naturally endowed with this Humidity deposited there by several excretory Ducts, in order to render it fit for the Purpose: And *Malpighius* himself takes notice of this Singularity in this Flower, tho' he ascribes no Use to it.

The next Example proposed by Mr. Morland, is the *Yellow Lilly*, which, according to his Figure, is represented as having *Apices* equally high with the Top of the *Stylus* and the *Petala* over-topping each other; whereas he says, that by the narrowest Inspection he ever could make, the Top of the *Apices* (they being then perpendicularly situated) reaches no higher than the Neck of the Button upon the Top of the *Stylus*, and that this is before the *Apices* begin to burst, and shed the Dust; but as soon as the Flower begins to open, they depart from the *Stylus*, and force the *Petala* outwards, by a certain Elasticity, and expand themselves: This being done, they immediately change their Posture from a perpendicular to an oblique, or horizontal one; nor do they ever pour out their Dust or *Farina*, till they can conveniently drop it upon the Bottom of the Flower, and towards the Root of the *Pistillum*.

But taking it for granted, that it were so, the Top of the *Stylus* (which the Doctor calls the *Button*, in opposition to the *Apices Stamini*) he says is so compact, and of so firm a Substance, that it is next to impossible that the *Farina* in Substance, or in integral Parts, can pass through it.

If the integral Parts, the compleat Grain, the minute *Globuli*, in which the whole Seminal Plant is contained cannot then enter, the whole Compound must be dissolv'd, and the minute Seminal Particles in this small Grain of Dust must be disunited; and if so, how shall these again come to cement, so as to make up one continued Body? Or how shall this little Body so united, penetrate a second time the Partition Wall betwixt the *Stylus* and *Pistillum*? And again, how shall it find out its Way to its Nest, in the proper *Embryo* of the Seed?

The Doctor takes notice of the *White Lilly*, the *Orange Lilly*, the *Martagon Lilly*, &c. as Objections to the Opinions of Mr. Morland, Bradley, &c. and also mentions the *Iris*, as a most pregnant Instance, that the *Farina* cannot so much as come at the *Pistillum*; for having six *Petala*, the three *Stamens* with long *Apices*, lie hid between the three *Petala* which hang downwards, and three large Expansions of the *Bifid Stylus*, and the upper Part of the down-hanging *Petalon*: The *Farina* can never reach the Center of the *Stylus*, tho' it were hollow, which it is not; but must descend along its Out-side, to the Top and Out-side of the Rudiment of the Fruit, there to emit its *Effluvia*.

These and other Instances, he concludes, are sufficient Proof that the *Farina* cannot enter the *Stylus*, penetrate into the *Pistillum* or inner Part of the Seminal Vessel, nor have the least Access to the *Embryo* of the Seed.

As to the Objection, That there is not Passage sufficient to admit the Male Seed into the

the *Uterus*, or even into the *Ovaries*, it is thus answer'd :

If it be consider'd how every Flower when it is prepar'd for the Act of receiving the Male Seed, is so much under the Influence of the Sun, that the *Petals* open at its Approach, and shut up again at its Departure, it very well explains how the *Pistillum* or Female Parts of *Generation* are relax'd at one time more than another, *i. e.* that the Female Parts are more relax'd at the Opening of the Flower than when the Flower is shut up; for the Flower-leaves adhering to the Bottom of the *Pistillum*, must consequently, when they bend back, put every Part of the *Pistillum* into a different Posture to that in which it was when the *Petals* were shut.

And it is certain, that it is the Presence of the Sun that ripens the Male Dust in the *Apices*, and opens the little Cases in which it is contained, giving them a Springiness that flings forth that Dust as soon as 'tis ripe, so as to scatter it to a considerable Distance. The Female Parts are at this time dilated by the opening of the Flower-leaves, and the *Apices* or *Chivets* concurring at the same time in flinging forth their Male Dust, answer the same End in the *Generation of Plants*, that the Act of *Copulation* does among Animals.

Having thus given several Reasonings and Arguments used by various Authors, who have made it their Study to investigate the Mode of *Generation* of Vegetables, whether the Impregnation of them proceeds from the *Farina fecundans*, or Male Dust entering the *Uterus* of Plants in Substance, or by *Effluvia's*, I shall not take upon me to determine the Dispute, especially since Mr. Boyle has proved, that all *Effluvia's* are subtile Particles of Matter, so that it matters not how small or minute these Particles are, since a Body in its first State may be so minute as to be scarcely perceptible.

I shall therefore conclude with mentioning a few Experiments of my own, which I communicated to Dr. Patrick Blair, which he improv'd as a Proof of his Opinion of *Effluvia*; and Mr. Bradley also, as a Proof of the *Farina* entering the *Uterus* in Substance, and leave the curious Enquirer to determine on that Side of the Question, which Reason and Experiment shall influence him.

I separated the Male Plants of a Bed of *Spinage* from the Female, and the Consequence was, that the Seed did swell to the usual Bigness; but when sow'd, it did not grow afterwards: and searching into the Seed, I found it wanted the *Punctum Vitæ*.

I set twelve *Tulips* by themselves, about six or seven Yards from any other; and as soon as they blew, I took out the *Stamina* so very carefully, that I scatter'd none of the Male Dust; and about two Days afterwards, I saw *Bees* working on a Bed of *Tulips*, where I did not take out the *Stamina*; and when they came out, they were loaded with Dust on their Bodies and Legs, and I saw them fly into the *Tulips*, where I had taken out the *Stamina*; and when they came out, I found they had

left behind them sufficient to impregnate these Flowers, for they bore good ripe Seeds.

In a Parcel of *Savoys*, which were planted for Seed near white and red *Cabbages*, the Seeds when sown, produc'd half red, and some white *Cabbages*, and some *Savoys* with red Ribs, and some neither one Sort nor the other, but a Mixture of all Sorts together in one Plant, which I suppose might happen by the *Effluvia* impregnating the *Uterus* of each other.

In a Letter communicated by Paul Dudley Esq; to the Royal Society, wrote from New England, he mentions the interchanging of the Colours of the *Indian Wheat*, if the various Colours are planted in Rows near each other; but if they are planted separately, they constantly keep to their own Colour: And this interchanging of Colours has been observ'd, when the Distance between the Rows of Corn has been several Yards; tho' he says, if there happens to be a high Board Fence between the different colour'd Corns, the Alteration of Colours is intirely prevented.

Cucumbers and *Melons* do always produce Male and Female Flowers upon different Parts of the same Plant: The Male Flower (which appears upon a slender Footstalk, and has a large Style in the Middle cover'd with an Orange-colour'd *Farina*) is by the Gardeners commonly call'd False Blossoms, and are sometimes by unskillful Persons pull'd off soon after they appear, supposing that they weaken the Plants if suffer'd to remain, which is a very great Mistake: For in order to try this Experiment, I planted four Holes of *Melons* in a Place pretty far distant from any other; and when the Flowers began to appear, I constantly pull'd off all the Male Flowers from time to time before they open'd: The Consequence was, that all the young Fruit dropt off soon after they appear'd, and not one single Fruit remain'd to grow to any Size, tho' the Vines were equally strong with those which I had planted in another Place, where I suffer'd all the Flowers to remain upon them, from which I had a great Quantity of Fruit.

From these, and many other Experiments, it is very plain, that there is a Necessity that the *Embryo* of the Female Flower should be impregnated by the *Farina* or Male Dust, in order to render the Fruit perfect; but how, or in what manner it is perform'd is what we can only guess at, since in the *Generation of Animals*, our greatest Naturalists differ very much in their Opinions, nor can any of them ascertain any particular Method how it is perform'd: I shall therefore conclude with quoting the Words of the Reverend Mr. Hales, which are a most ingenious Summary of the whole Doctrine of the *Generation of Plants*.

" If I (says he) may be allow'd to indulge
" Conjecture in a Case in which the most
" diligent Enquirers are, as yet, after all their
" laudable Researches, advanc'd but little farther than mere Conjecture, I would propose
" it to their Consideration, whether from the
" manifest Proof we have, that Sulphur strongly
" attracts Air, a Hint may not be taken, to
" consider whether this may not be the primary
" Use

“ Use of the *Farina Facundans*, to attract or
 “ unite with it self elastick or other refin’d
 “ active Particles; That this *Farina* abounds
 “ with Sulphur, and that a very refin’d Sort,
 “ is probable from the subtile Oil which
 “ Chymists obtain from the Chives of *Saffron*:
 “ And if this be the Use of it, was it possible
 “ that it could be more aptly plac’d for the
 “ Purpose on very moveable *Apices* fix’d on
 “ the slender Points of the *Stamina*, whereby
 “ it might easily, with the least Breath of
 “ Wind, be dispers’d in the Air, thereby
 “ surrounding the Plant, as it were, with
 “ an Atmosphere of sublimed sulphureous
 “ Pounce; for many Trees and Plants abound
 “ with it, which uniting with the Air Par-
 “ ticles, they may, perhaps, be inspir’d at
 “ several Parts of the Plant, and especially at
 “ the *Pistillum*, and be thence convey’d to the
 “ *Capsula Seminalis*, especially towards Even-
 “ ing and in the Night, when the beautiful
 “ *Petala* of the Flowers are clos’d up, and
 “ they, with all the other Parts of the Vege-
 “ table, are in a strongly imbibing State:
 “ And if to these united, sulphureous, and
 “ aerial Particles, we suppose some Particles
 “ of Light to be join’d, for Sir *Isaac Newton*
 “ has found, that Sulphur attracts Light
 “ strongly; then the Result of these three by
 “ far the most active Principles in Nature,
 “ will be a *Puñtum Salient* to invigorate the
 “ *Seminal Plant*: And thus we are at last
 “ conducted by the regular Analysis of Ve-
 “ getable Nature, to the first enlivening
 “ Principle of their minutest Origin.

GENISTA JUNCEA; [is so call’d, of
Genu, a *Knee*, because it is a very flexible
 Plant.] Spanish Broom.

The Characters are;

*It hath very pliant Branches: The Leaves are
 plac’d alternately, or in Whorles: The Flowers
 are of the Pea-bloom kind, which are succeeded
 by smooth Pods, containing several Kidney-shap’d
 Seeds in each.*

The Species are;

1. **GENISTA JUNCEA**; *J. B.* The yellow
 Spanish Broom.

2. **GENISTA**; *hortensis, major, Lusitanica.*
Vir. Lusit. The greater Portugal Broom.

The first of these Plants is very common in
 the Nurseries near *London*, and is generally
 sold by the Gardeners amongst other flower-
 ing Shrubs for Wilderness-Quarters; where,
 by its long Continuance in Flower, together
 with its Sweetness, it affords an equal Pleasure
 with most other flowering Shrubs.

This Plant is easily propagated by sowing
 the Seeds (which are annually produc’d in
 great Quantities upon the old Plants) in the
 Spring of the Year, upon a warm dry Soil,
 and in an open Exposure, observing not to
 cover the Seeds too thick with Earth, (a quar-
 ter of an Inch will be sufficient); nor should
 you water the Ground until the Plants come
 up, which will be in about six Weeks after
 sowing, for too much Moisture rots the
 Seeds: During the Summer-time you must
 diligently clear the young Plants from Weeds,

which, if suffer’d to remain, would in a short
 time over-run and destroy the Plants. In this
 Place the Plants should remain until the *March*
 following; at which time you should prepare
 a fresh Spot of Ground, in proportion to the
 Quantity of Plants you have to transplant:
 The Ground being well dug and level’d, you
 should mark out the Rows strait by a Line at
 three Feet Distance from each other: Then
 take up your Plants, being careful not to break
 their Roots, which would be very injurious to
 them, and set them a Foot asunder in the
 Rows, closing the Earth to them with your
 Feet; and if the Weather should be very dry,
 you may give them a little Water, laying on a
 little Mulch first upon the Surface of the
 Ground near their Stems: This watering may
 be repeated once a Week, if the Season should
 prove dry, until they have taken fresh Root,
 which will be by the Beginning of *May*, after
 which time they will be in no Danger of
 miscarrying: You must observe also to keep
 the Ground clear from Weeds; and in *Febru-*
ary or *March*, you should dig up the Ground
 between the Rows to loosen the Earth, that
 the Roots of the Plants may the easier insi-
 nuate themselves and spread on each Side,
 otherwise they will be subject to have down-
 right Tap-roots, which will render them very
 difficult to transplant. In this Nursery the
 Plants may remain two Years, by which time
 they will be full large enough to be remov’d
 to the Places where they are design’d to
 remain for Flowering: Nor should they be
 suffer’d to continue above three Years at most
 in the Nursery, for after that time it will be
 very dangerous to remove them, they being
 some of the worst to transplant, when grown
 large, that I know amongst all the Variety of
 Flowering Trees. The best time for trans-
 planting them is, as I said before, towards the
 latter End of *March*, observing to do it in a
 perfect mild Season, and when the Wind is
 South, or Westerly; for if the Wind blows
 from the North or East at this Season, it either
 brings frosty Nights or cold drying Winds,
 both of which are equally hurtful to these
 Plants when first remov’d. You should observe
 to lay some Mulch round their Stems, to
 prevent the Sun and Wind from penetrating
 the Earth and drying their Fibres; as also to
 water them in dry Weather, as was before
 directed, until they have taken Root, after
 which time they will be in no Danger.

This, although a Native of *Spain*, and the
 warm Parts of *Europe*, yet is become so hardy
 as to resist the Cold of our Climate in the open
 Air, and will grow to the Height of twelve or
 fourteen Feet, and produce annually large
 Quantities of sweet yellow Flowers, and per-
 fect its Seeds; which if suffer’d to fall to the
 Ground, will remain, and come up the suc-
 ceeding Spring, whereby you may be easily
 furnish’d with young Plants without much
 Trouble, provided the Ground be not dug,
 and the Seeds bury’d too deep to grow.

The *Portugal* Sort is at present very rare
 in *England*, and only to be found in some
 curious Collections of Plants: This is not so
 Y y y hardy

hardy as the former, and requires to be shelter'd during the Winter, tho' I am apt to believe it will stand abroad when grown woody, if planted in a light dry Soil and a warm Situation. This Plant flowers with us, but hath not as yet produc'd any Fruit in England that I have heard.

GENISTA SPINOSA; the Furz, Whins, or Gorse.

The Characters are;

The whole Plant is very thorny: The Flowers (which are of the Pea-bloom kind) are dispos'd in short thick Spikes, which are succeeded by short compress'd Pods, in each of which are contain'd three or four Kidney-shap'd Seeds.

The Species are;

1. **GENISTA SPINOSA**; *vulgaris*. Ger. *Emac.* The Common Furz, Whins, or Gorse.

2. **GENISTA SPINOSA**; *minor*. Park. *Theat.* The lesser Furz.

3. **GENISTA**; *minor*, *Asphalathoides*, vel *Genista Spinosa*, *Anglica*. C. B. P. Needle-Furz, or Petty-Whin.

These three Plants do all of them grow wild on the Heaths and Up-land Commons in divers Parts of England, and are seldom planted in Gardens: but if they are rightly dispos'd in Clumps or Wilderness Quarters, and train'd up to regular Heads, they will make a very agreeable Diversity amongst other flowering Shrubs; and for their long Continuance in Flower, do merit a Place in every such Plantation.

The first of these Plants is sometimes us'd to make Hedges, for which Purpose it will do very well for a few Years, provided it be kept close at first, and the Ground underneath always kept clear from Weeds: And it should always be observ'd, never to cut these Hedges in very dry Weather, nor too early in the Spring, or too late in Autumn; for if it should prove cold frosty Weather, or drying easterly Winds happens soon after it be cut, they will render the Hedge very unsightly for a long time, and often destroy many of the Plants, whereby the Form and Beauty of the Hedge will be intirely lost; and if you cut it too close into the old Wood, it rarely ever breaks out again: so that if the Hedge should have grown beyond the Bounds you intended it, the better Way will be, to cut it quite down to the Ground, and let it rise again from the Roots. See more of this under the Article of *Hedges*.

The second Sort never rises so high as the first, and is therefore proper to intermix with Shrubs of shorter Growth; but will do for all the Purposes of the first, and is equally as common in most Parts of England.

The third Sort seldom rises above three Feet high; nor will it support it self while young, and therefore should be fasten'd to a Stake, training the Stem upright, and form'd into a regular Head; and after two or three Years being thus manag'd, it will support it self, and make a very handsome Appearance. This Plant produces its Flowers in April, and continues them through May, during which

Season it affords a very agreeable Prospect. The Seeds ripen in August; and if suffer'd to scatter, they will come up the succeeding Spring.

These Plants may be all propagated by sowing their Seeds in March: which if intended for a Hedge, should be sown in the Place where they are to remain; but if for Standards to plant in Wildernesses, they should be sown thin upon a Bed of light Earth, in an open Situation; and when the Plants come up, you should carefully clear them from Weeds; and where they are too close to each other, they should be pull'd out, leaving 'em at least six Inches distant from each other: in these Beds they should remain until the Spring following, at which Time they should be remov'd either into the Places where they are to continue, or else into a Nursery, as was directed for the *Spanish Broom*, observing the same Method and Season for this Work as was there directed, to which this Plant exactly agrees in Culture, and is equally as difficult to transplant when grown old; therefore, to avoid Repetition, I shall refer the Reader to that Article for farther Instructions.

GENTIANA [takes its Name from *Gentius* a King of *Illyria*, who first discover'd the Virtues of this Plant.] *Gentian*, or *Fell-wort*;

The Characters are;

The Leaves grow by Pairs opposite to each other: The Cup of the Flower consists of one membranous Leaf: The Flower consists of one Leaf, and is shap'd like a Cup, being cut into four, five, or more Segments; it is succeeded by a membranous Oval-shap'd Fruit, ending in a sharp Point, opening lengthwise into two Parts, and containing many flat, roundish Seeds, which are border'd with a leafy Rim.

The Species are;

1. **GENTIANA**; *major*, *lutea*. C. B. P. The Great *Gentian* yellow Flowers.

2. **GENTIANA**; *asclepiadis*, *folio*. C. B. P. *Gentian* with a Swallow-wort Leaf.

3. **GENTIANA**; *Alpina*, *flore magno*. J. B. Large flower'd *Gentian* of the Alps, commonly call'd *Gentianella*.

4. **GENTIANA**; *cruciata*. C. B. P. Cross-wort *Gentian*.

5. **GENTIANA**; *angustifolia*, *autumnalis*, *major*. C. B. P. Great Autumnal *Gentian*, or Calathian Violet.

There are several other Sorts of *Gentian*, some of which are Natives of England, and others are Inhabitants of the Alps and other cold mountainous Parts of Europe: But as they are Plants which are rarely tam'd, so as to thrive well in Gardens, especially near London, I shall pass them over in this Place, and proceed to the Culture of those here inserted, all of which are worthy of a Place in every good Garden.

The first Sort, which is the true *Gentian*, whose Root is us'd in Medicine, is an Inhabitant of the Mountains near *Geneva*, and the Pastures of the Alps and Pyrenees: This Plant is propagated by Seeds, which should be sown soon after they are ripe; for if it be

be kept long out of the Ground, it rarely grows. The best Method is, to sow the Seeds in a large Pot fill'd with light undung'd Earth, covering them about a quarter of an Inch thick with the same light Earth; then place the Pots in the Shade, where they may remain until November, at which time you may remove them into a Place where they may have the Morning Sun; in this Situation they may remain 'till March following, by which Time the young Plants will appear above-ground: you must then remove the Pots again into a shady Place, where they should remain all the Summer-season, observing to clear them from Weeds, as also to water them in dry Weather, which will greatly promote their Growth. The Spring following they will be fit to transplant; at which Time you should prepare a shady moist Border, that should be well dug and loosen'd: then shake the Earth out of the Pots, by which means you will the more readily take them out without injuring their Roots. The Distance they should be allow'd, if design'd to remain for good, must be fourteen Inches square: but if they are intended to be remov'd again, four or six Inches will be sufficient. In planting them, you must observe to make deep Holes, so that the Roots, which generally grow long, may be plac'd full as deep as they are in length, that no Part may appear above-ground: nor should they be bent at the bottom, which would check their downright Growth, and greatly injure them. The best Season to transplant them is in the Beginning of March, just as they begin to shoot.

In about five or six Years Time, if the Plants thrive well, and are not disturb'd, they will begin to flower, and will produce good Seeds, so that it will not be difficult to have them in great Plenty. But as it is hardly worth cultivating for Medicinal Use, it being generally imported hither at a very moderate Price; so the Beauty thereof is not such as would recommend the having it in great Quantities; tho' a few of 'em will do very well to make a Variety.

The second and fourth Sorts are at present very uncommon in England, and only to be found in some curious Gardens; these are both of them very pretty Ornaments to a Garden: They are propagated by parting their Roots either in Spring or Autumn, and require a pretty strong Soil, and a shady Situation.

The third Sort was formerly more common in the Gardens near London than it is at present, but in some old Country Gardens it is still frequently to be met with: This is a very beautiful Plant and well worth propagating: it is increas'd by parting the Roots early in the Spring; for if it be left undone 'till March, the Flower-buds will begin to appear; after which Time, if you remove them, it will greatly weaken their flowering. This Plant requires a strong, moist, cool Soil, and should be planted where they may have only the Morning Sun: for if they are too much expos'd to Heat, they are very subject to decay: nor do they care to be often trans-

planted, which will also make them poor and weak: And I am apt to believe that this has occasion'd their present Scarcity near London, where People are too apt to part and divide Plants often, in order to increase 'em and thereby frequently destroy their whole Stock.

The fifth Sort grows wild in divers Parts of the North, as in York-shire, Cumberland, and Northumberland, and is equal to any of the above-mention'd Kinds for Beauty, but is rarely to be found near London. The Roots of this Plant may be brought from the Places of its natural Growth, and planted in a cool, moist, undung'd Soil, where it will grow, provided it be not under the Drip of Trees, which this Plant by no means cares for: nor should it be often remov'd, but suffer'd to remain (as was said above), by which means it will thrive, and produce beautiful Flowers.

GENTIANELLA; vide Gentiana.

GERANIUM [takes its Name from *Γέραν*, Gr. a Crane or Stork, because its Fruit resembles the Bill of a Crane.] Crane's-bill.

The Characters are;

The Leaves are for the most part conjugate: The Cup of the Flower consists of one Leaf, which is divided into five Parts, and expanded in Form of a Star: The Flowers of the European Kinds consist of five Leaves, and those of the African Sorts (for the most part) of four, somewhat resembling a crested or lipp'd Flower, with ten Stamina surrounding the Ovary: The Fruit is of a pentagonal Figure, with a long Beak, containing at the Base five Seed-vessels, in each of which is contain'd one tail'd Seed, which, when ripe, is cast forth by the twisting of the Beak.

The Species are;

1. GERANIUM; *batrachioides*, *Gratia Dei Germanorum*. C. B. P. Crane's-bill, with a Crow-foot Leaf, and large blue Flowers.

2. GERANIUM; *batrachioides*, *Gratia Dei Germanorum*, *flore albo*. Boerh. Ind. Crow-foot-leav'd Crane's-bill, with a white Flower.

3. GERANIUM; *batrachioides*, *Gratia Dei Germanorum*, *flore variegato*, C. B. P. Crow-foot-leav'd Crane's-bill, with a strip'd Flower.

4. GERANIUM; *batrachioides*, *longum radicum*, *odoratum*. J. B. Long-rooted sweet-smelling Crane's-bill, with a Crow-foot Leaf.

5. GERANIUM; *sanguineum*, *maximo flore*. H. Ox. Bloody Crane's-bill, with a large Flower.

6. GERANIUM; *sanguineum*, *cauliculis erectis*, *foliis obscure virenti floribus minoribus*. H. L. Bloody Crane's-bill, with upright Stalks, dark-green Leaves, and small Flowers.

7. GERANIUM; *hematodes*, *foliis majoribus*, *pallidioribus altius incis*. Raii. Syn. Bloody Crane's-bill, with larger, paler, and more deeply divided Leaves.

8. GERANIUM; *hematodes*, *Lancastrense*, *flore eleganter striato*. Raii. Hist. Bloody Crane's-bill, with a variegated Flower.

9. GERANIUM; *s. nodosum Plateau*. Clus. Hist. Knotty Crane's-bill.

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10. GERANIUM; *phaum five fuscum, petalis reflexis, folio non maculoso*. H. L. Brown Crane's-bill, with reflex'd Petals, and Leaves not spotted.
11. GERANIUM; *phaum five fuscum, petalis rectis seu planis, folio maculato*. H. L. Brown Crane's-bill, with plain Petals, and spotted Leaves.
12. GERANIUM; *Romanum, versicolor five striatum*. Park. Par. Roman Crane's-bill, with strip'd Flowers.
13. GERANIUM; *Alpinum, Coriandri folio, longim radicatum, flore purpureo majore*. Michel. Long-rooted Crane's-bill of the Alps, with a Coriander Leaf, and a large purple Flower.
14. GERANIUM; *batrachoides, montanum, nostrat*. Ger. Mountain Crane's-bill, with a Crow-foot Leaf.
15. GERANIUM; *Orientale, columbinum, flore maximo, Asphodeli radice*. T. Cor. Oriental Dove's-foot Crane's-bill, with an Asphodel Root, and a large Flower.
16. GERANIUM; *cicutæ folio Moschatum*. C. B. P. Musk'd Crane's-bill or Moscovy.
17. GERANIUM; *latifolium, annuum, caruleo flore, acu longissimâ*. H. Ox. Broad-leav'd annual Crane's-bill, with a blue Flower, and a very long Beak.
18. GERANIUM; *myrrhinum tenuifolium, flore amplo purpureo*. Barr. Obs. Fine cut-leav'd Crane's-bill, with an ample purple Flower.
19. GERANIUM; *Africanum, arborescens, ibisci folio rotundo, carlinæ odore*. H. L. African Tree Crane's-bill, with a round Marsh-mallow Leaf, and a Smell of the Carline Thistle.
20. GERANIUM; *Africanum, arborescens, ibisci folio anguloso floribus amplis purpureis*. Phil. Transf. 388. African Tree Crane's-bill, with an angular Marsh-mallow Leaf and large purple Flowers.
21. GERANIUM; *Africanum arborescens, alchimilla hirsuto folio, floribus rubicundis*. Com. Præh. African Tree Crane's-bill, with a hairy Ladies-Mantle Leaf and red Flowers.
22. GERANIUM; *Africanum, arborescens, malva folio plano lucido, flore elegantissime kermesino*. Di van Leur. Boerb. Ind. African Tree Crane's-bill, with a plain, shining, mallow Leaf, and an elegant scarlet Flower.
23. GERANIUM; *Africanum frutescens, malva folio, odorato latiniato*. H. L. African shrubby Crane's-bill, with a jagged, sweet smelling Mallow Leaf.
24. GERANIUM; *Africanum, frutescens, malva folio, laciniato, odorato instar melissæ, flore purpurascens*. Boerb. Ind. African shrubby Crane's-bill, with a jagged, Mallow Leaf smelling like Balm, and a purplish colour'd Flower.
25. GERANIUM; *Africanum, arborescens, malva folio mucronato, petalis florum inferioribus vix conspicuis*. Phil. Transf. African Tree Crane's-bill, with a pointed Mallow Leaf, and the under Petals of the Flower scarce discernable.
26. GERANIUM; *Africanum frutescens, folio crasso & glauco, Acetosa sapore*. Com. Præh. African shrubby Crane's-bill, with a thick glaucous Leaf, and an acid Taste like Sorrel.
27. GERANIUM; *Africanum, frutescens, chelidonii folio, petalis florum angustis, albidis, caroso caudice*. Phil. Transf. *Geranium Africanum, folio alcea, flore albo*. Boerb. Ind. alt. African shrubby Crane's-bill, with a Celandine Leaf, the Petals of the Flower white and narrow, and a fleshy Stalk.
28. GERANIUM; *Africanum, noctu olens, tuberosum & nodosum, aquilegia foliis*. H. L. African Crane's-bill, smelling sweet in the Night, with knotty tuberosc Stalks and Leaves like Columbine.
29. GERANIUM; *Africanum, folio alcea, flore coccineo fulgidissimo*. Boerb. Ind. alt. *Geranium Surianense, cheledonii folio, flore coccineo petalis inaequalibus*. Hors. Piss. African Crane's-bill, with a vervain Mallow Leaf, and a deep Scarlet Flower.
30. GERANIUM; *Africanum, arborescens, alchimilla folio hirsuto, elegantissime variegato, floribus rubicundis*. Boerb. Ind. alt. African Tree Crane's-bill, with a hairy Ladies-mantle Leaf elegantly strip'd, and red Flowers, commonly call'd the Strip'd Geranium.
31. GERANIUM; *Africanum, foliis inferioribus asari, superioribus staphidisagrie, maculatis, splendentibus, & acetosa sapore*. Com. Præh. African Crane's-bill, with the under Leaves like Asarabacca, and the upper Leaves like Stavesacre, shining, spotted, and tasting like Sorrel.
32. GERANIUM; *Africanum, alchimilla hirsuto folio, floribus albidis*. H. L. African Crane's-bill, with a hairy Ladies-mantle Leaf and whitish Flowers.
33. GERANIUM; *Africanum, folio malva crasso, molli, odoratissimo, flosculo pentapetalo, albo*. Boerb. Ind. alt. African Crane's-bill, with a thick, soft, sweet-smelling Mallow Leaf, and a small white Flower consisting of five Leaves.
34. GERANIUM; *Americanum, noctu olens, radice tuberosa, triste*. Corn. H. Ox. American tuberosc-rooted Crane's-bill, smelling sweet in the Night.
35. GERANIUM; *Africanum, tuberosum, anemones folio, incarnato flore*. Par. Bat. Tuberosc-rooted African Crane's-Bill, with an Anemomy Leaf, and a pale flesh-colour'd Flower.
36. GERANIUM; *Æthiopicum, noctu olens, radice tuberosâ, foliis myrrhidis angustioribus*. Breyn. Cent. Night sweet-smelling Ethiopian Crane's-bill, with a tuberosc Root and narrow Cicely Leaves.
37. GERANIUM; *Africanum, noctu olens, folio vitis hirsuto, tuberosum*. H. A. Night sweet-smelling African Crane's-bill, with a hairy Vine Leaf, and a tuberosc Root.
38. GERANIUM; *Africanum, folio coriandri, floribus incarnatis minus*. H. L. African Crane's-bill, with a Coriander Leaf, and a lesser flesh-colour'd Flower.
39. GERANIUM; *Africanum, uva crispa folio, floribus exiguis rubellis*. H. L. African Crane's-bill, with a Gooseberry Leaf, and small reddish Flowers.
40. GERANIUM; *Africanum, betonica folio procumbens, floribus parvis eleganter variegatis*. Pluk. Alm. African trailing Crane's-bill, with a Beto-

a Betony Leaf, and small, beautiful, strip'd Flowers.

The fifteen first-mentioned Sorts are abiding Plants; the Leaves of some of them do decay in Winter, but their Roots remaining, shoot again early in the Spring: Some of these Sorts are common in several Parts of *England*, yet they deserve a Place in every good Garden; where if they are rightly dispos'd they will have a good Effect, by adding to the Variety; and as they are very hardy Plants, and require but little Care in their Culture, growing in almost any Soil or Situation, so they are very proper for large Gardens to be planted in wide Borders, or by the Sides of Wildernesses and other shady Walks, where few other Plants will thrive, and these continuing in Flower most part of the Summer, do greatly add to the Beauty of such Places.

These are all increased by parting their Roots, the best Season for which is in *October*, that they may take Root before the hard Frosts begin; or else in *February*, that they may get Strength before the great Heat and Drought comes on, which would occasion their Flowers to be small, and but few in Number. These Roots may remain two or three Years unremoved, according as you find them increase and spread; for some Sorts will not spread so far in three Years, as others will do in one; so that if the spreading Kinds are suffered to grow undisturb'd for two or three Years, they will spread the whole Width of the Border where they are planted, so that if they are not transplanted often, their Roots should be cut round every Year to keep them within Compass.

These Sorts may also be propagated by Seeds, which they afford every Year in great Plenty; but as they are increased very fast in the former Way, so it is hardly worth while to sow their Seeds.

The 16th, 17th and 18th Sorts are annual Plants, and should either be sown every Year, or their Seeds permitted to scatter themselves, the latter of which is the surest Method, for the Plants will come up in *Autumn* soon after the Seeds fall, and will abide the Winter, and flower early the succeeding *Spring*, whereby you will always be sure to have their Seeds perfected, which does not constantly happen to those sown in the Spring. The 16th Sort is preserved in many Gardens, for the sweet Scent its Leaves afford when rubb'd between the Fingers, which occasioned its being called *Musk*, or *Muscovy*. There is but little Beauty in the Flowers of this Plant; however it may be admitted to have a Place in some odd Corner, or shady Border in a Garden for Variety, it being very hardy, and will thrive in almost any Soil or Situation.

The 17th and 18th Sorts do produce very handsome Flowers, and as they are Plants which take up but little Room, and require very little Trouble to cultivate them, so it is worth while to allow them a Place for Variety, in some Corner of the Garden, these being both as hardy as the former Sort.

The 19th, 20th, 21st, 22d, 23d, 24th,

26th, 27th, 28th, 29th, 30th and 31st Sorts, are Natives of a warmer Climate than ours, and require to be shelter'd in Winter: These being all shrubby Plants, may be propagated by planting their Cuttings, any Time in Summer, in a Bed of light, fresh Earth, observing to water and shade them until they have taken Root, which will be in about a Month's Time after planting, being careful to take off the Mats or other Covering every Night, that the Cuttings may have the Benefit of the Dews; as also whenever there may happen to be any Showers in the Day-time, never to cover them but when the Sun shines very hot upon the Bed.

In this Place they may remain two Months from their first planting, by which Time they will be rooted sufficient for transplanting; you must therefore prepare some Pots, which should be about seven Inches over at the Top, these should be filled with fresh, light Earth, and having taking the Plants up, with as much Earth as possible to their Roots, you should plant them into these Pots, each Plant into a separate one, removing them into a shady Situation until they have taken fresh Root, observing to water them frequently as they may have occasion; and when they are rooted, you should remove them to a more expos'd Situation to harden them, in which Place they should remain until the Middle of *October*, when the Mornings begin to be frosty, at which time they ought to be removed into the Green-house, where they should be placed as near the Windows as possible, observing to let the Windows be open, that they may have as much free Air as possible, until the Weather begins to be very cold.

These Plants, during the Winter Season, will require to be often refresh'd with Water; but they should never have too much given them at once; they should also be frequently pick'd to take off all dead or decay'd Leaves, which if suffered to remain upon them, will not only render the Plants unsightly, but also infect the Air of the Green-house, especially when the Windows are kept shut close, and thereby become injurious to all the Plants placed therein.

You must also observe to set these where they may be clear from the Heads of other Plants, for they will by no means bear to be stifled, which would cause them to cast their Leaves; nor do they require to be kept very warm in Winter, for if they are but screen'd from the Frost, it will be sufficient, and all artificial Warmths are prejudicial to these Plants.

The 29th Sort is very subject to cast its Leaves in the *Autumn*, and thereby appears to unskilful Persons as dead; but if it be suffered to remain in the Pot undisturbed, and very little Water given to it during this Season, it will come out again in Winter as fresh and lively as before; but much Moisture during this State of Inactivity, very often destroys this Plant. This for the Richness of the Colour of its Flowers, vastly exceeds all the other Sorts, tho' the 22d Sort is a very beautiful

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ful Flower, and continuing most Part of the Summer and Autumn in flower, renders it very valuable; as is the 30th Sort, for the Beauty of its variegated Leaves.

The 32d and 33d Sorts are of humbler Growth than the former, tho' they are Natives of the same Country, and do therefore require the same Defence in Winter: These may also be propagated by Heads cut off from the old Plants, and treated as was directed for the Cuttings of the shrubby Kinds. The 32d Sort is very subject to ramble, and affords Supply enough of Cuttings; but the 33d Sort increases much slower: This Plant is of an uncommon strong sweet Scent; the Leaves, when touch'd, smelling somewhat like *Anis-feed*: but the Flowers of neither of these two Sorts are very beautiful; however, they should have a Place in all Collections of Plants for Variety Sake.

These Plants may also be propagated by sowing of their Seeds in the Spring of the Year upon a moderate Hot-bed; and when they are come up two Inches high, they should be planted into another Bed, with a little warm Dung under it to promote their Rooting: In this Bed they may be planted about six Inches square; and when they are rooted, you should harden them by Degrees, so that as the Weather becomes warmer they may the better endure the open Air: In *July* you should transplant them into Pots, as was directed before for the Cuttings, and manage them in the same manner. During the Summer-season, these Plants should be set abroad with *Myrtles*, *Oleanders*, and other Green-house Plants, where, being artfully intermix'd therewith, they add greatly to the Variety, and continue flowering most Part of the Year.

The 34th, 35th, 36th, and 37th Sorts have all knobby Roots, and increase but slowly thereby: Therefore in order to have a Stock of these Plants, you should carefully gather their Seeds, (which they seldom fail to produce every Year) and sow them, as was directed for the other *African* Sorts, upon a moderate Hot-bed, managing them also accordingly, with this Difference only, *viz.* that they should have less Water; and the Pots in which they are planted should be smaller, especially at first, for as they are Plants which make but small Roots, so the putting them into large Pots is very prejudicial to them. These are all esteem'd for the Beauty of their Flowers, and their agreeable Sweetness in the Evening after the Sun has left them, for before that you cannot perceive any Scent in them, tho' afterwards it becomes so strong as to perfume the Air to some Distance from the Place where they stand. This, I suppose, may be accounted for from the Warmth of the Sun rarefying those *Effluvia*, so as to be too minute to strike our Organs of Smelling with any Force while the Heat is continu'd; but when the Cool of the Evening approaches, these *Effluvia* are of larger Bulk, and become preceptible to us in Proportion thereto.

During the Summer-season, these Plants may be expos'd, amongst other Exoticks,

in the open Air, being very careful not to give them too much Water, which often occasions their rotting, especially towards Autumn, when their green Leaves begin to decay, at which Time they should have it very sparingly; and if the Season should prove very wet, you should move the Pots on one Side, or remove them under Shelter to protect them from it: And about the Beginning of *October* you should remove them into the Green-house, placing them as near as possible to the Windows, that they may have a good Quantity of free Air, when the Windows are open'd, for if they are defended from Frost and much Wet, it will be sufficient, they not being extream tender, nor will they ever require any artificial Warmths in Winter, but, on the contrary, as much Air as possible in mild Weather.

These Plants require a very light, sandy Soil; but should not have too much Dung. The Mixture of Earth in which I find them grow best, is as follows: 1st, Take a Quantity of fresh Earth from a Pasture-ground that is inclining to a Sand, (and if you have Time for the Turf to rot before you have Occasion for it, add that to the Earth); then mix about a third or fourth Part as much Sea-Sand, in Proportion to the Lightness of your Soil; add to this about a fourth Part as much rotten Tanners Bark: mix all well together, and let it lie in a Heap two or three Months before you have occasion for it, observing to turn it over two or three times, that the Mixtures may be the better united; and if before it be us'd, you pass it through a rough Screen to take out all large Stones, Roots, &c. it will be the better; but by no means sift the Earth fine, as is the Practice of many People, for I am sure it is doing a great deal of Damage, (as was shewn under the Article *Abies*): When these Plants are potted, you should carefully lay some Stones or Shreds in the Bottom of the Pots, that the Water may the better pass off; nor should you plant them in Pots too large; which is equally injurious to them, as was before-mentioned.

The 38th and 39th Sorts are Plants of shorter Duration than those above-mentioned, rarely continuing above two Years; so that in order to preserve these, you should save the Seeds every Year, which should be sown upon a moderate Hot-bed in the Spring, and manag'd as was directed for the last mention'd Sorts. These do often produce Flowers and Seeds the same Summer; but the second Year, provided they are defended from the Frost in Winter, they will flower early, and perfect their Seeds before Autumn.

The 40th Sort is annual: This must be sown on a moderate Hot-bed, and the Plants brought forward in the Spring; but when they begin to flower, must be set in the open Air, otherwise the Flowers will fall away without producing any Seeds. This, tho' a Plant of no great Beauty, yet is worthy of a Place in every Collection of curious Plants.

There are a great Number of *Geraniums* which I have not here mention'd, many of which

which are Natives of *England*, and others were brought from divers other Parts of *Europe*; but as these for the most part are annual Plants of no Beauty or Use, so I thought it needless to trouble myself or the Reader therewith.

GERMANDER; *vide* *Chamædrys*.

GEUM; [is so call'd of *γῆ*, the *Earth*, q. d. *Earth-herb*, or growing near the *Earth*, because its Leaves touch the Ground.] Hairy Kidney-wort or Sanicle.

The Characters are;

The Cap of the Flower is quinquefid: The Flower consists of five Leaves, which expand in Form of a Rose, having eight or ten Stamina or Threads surrounding the Ovary: The Fruit is roundish, and is split into two Horns at the Top; this becomes a bicausal Seed-Vessel containing many small Seeds.

The Species are;

1. **GEUM**; *palustre, minus foliis oblongis crenatis*. *Tourn.* Hairy Kidney-Wort, or Water-Sanicle.

2. **GEUM**; *angustifolium, autumnale, flore luteo guttato*. *Tourn.* Narrow-leav'd autumnal Sanicle, with a yellow spotted Flower.

3. **GEUM**; *rotundifolium, majus*. *Tourn.* Great round-leav'd spotted Sanicle.

4. **GEUM**; *folio subrotundo majori, pistillo floris rubro*. *Tourn.* London Pride, or None so Pretty.

The first of these Plants is found wild upon the Mountains of *Wales* and *Westmerland*, but will grow, if transplanted into a cool moist Place in a Garden.

The second is found in some Parts of *Cheshire*: This also delights in a strong, moist Soil, and a shady Situation; nor should these Plants be often transplanted, for they delight best in a poor Soil, and want very little Culture, therefore the best Method is to furnish yourself with Roots from their natural Places of Growth, for their Seeds seldom succeed if sown: These should be taken up with as much Earth about their Roots as possible; then plant them in some cold, shady Part of the Garden, (but not under the Drip of Trees) where, when they are once well fix'd, they will continue without any farther Care for several Years, and will annually produce large Quantities of beautiful Flowers: And with these Plants may such Parts of a Garden, where few other Things will thrive, be supply'd to great Advantage; so that did we but consider well what Plants delight in moist and strong Soils, and a shady Situation; and what require a dry light Soil, and a Sunny Exposure, we need never be at a Loss for Plants to embellish a Garden, be the Soil or Situation what it will: and 'tis for want of rightly considering how to adapt the proper Plants to each Soil and Situation, that we often see Natives of a low Valley planted upon a dry barren Soil, and those of dry sandy Hills upon a strong rich Soil; in both which Cases, they starve and come to nothing.

The third Sort is seldom planted in Gardens, except where the Owners are curious in Col-

lections of Plants, but yet deserves a Place amongst the former in a cool shady Border, where it will thrive very well.

The fourth Sort is the most common in the Gardens, and was formerly in greater Request than at present, it having been in great Use for bordering of Flower-beds; but as it increases very fast, so it is apt to spread too far, and sometimes decays in Patches, which renders it very unsightly: besides, it must be transplanted at least once a Year, otherwise it cannot be kept in any tolerable Order; however, a few Plants of this kind may be preserv'd as proper Furniture for shady Borders; but it will grow upon a drier Soil than any of the former Sorts.

GILLIFLOWER, or **JULY-FLOWER**; *vide* *Caryophyllus*.

GILLIFLOWER, or **STOCK-GILLIFLOWER**; *vide* *Leucoium*.

GILLIFLOWER, the *Queen's or Dame's-Violet*; *vide* *Hesperis*.

GINGER; *vide* *Zinziber*.

GINGIDIUM; *vide* *Vinaga*.

GLADE, is an open and light Passage made through a Wood, by lopping off the Branches of Trees along that Way.

GLADIOLUS, [takes its Name of *Gladius*, Lat. a *Sword*, q. d. *little Sword*, because the Leaves of this Plant resemble a Sword] *Corn-Flag*.

The Characters are;

It hath a fleshy, double, tuberosé Root; the Leaves are like those of the *Flower-de-Luce*; the Flower consists of one Leaf, and is shap'd like a Lily, spreading open at the Top into two Lips, the upper one being imbricated, and the under one divided into five Segments; the Ovary becomes an oblong Fruit divided into three Cells, which are fill'd with roundish Seeds wrapt up in a Cover.

The Species are;

1. **GLADIOLUS**; *utrinque floribus*. *C. B. P.* *Corn-flag*, with Flowers on both Sides the Stalks.

2. **GLADIOLUS**; *carnei coloris*. *Swert.* *Flor* *Flesh-colour'd Corn-flag*.

3. **GLADIOLUS**; *floribus uno versu dispositis, major, floris colore purpureo-rubente*. *C. B. P.* *Great Corn-flag*, with reddish Purple Flowers rang'd on one Side the Stalk.

4. **GLADIOLUS**; *major, Byzantinus*. *C. B. P.* *Great Corn-flag of Constantinople*.

5. **GLADIOLUS**; *utrinque floribus, floribus albis*. *H. R. Monsp.* *Corn-flag*, with white Flowers rang'd on each Side the Stalk.

6. **GLADIOLUS**; *maximus, Indicus*. *C. B. P.* *The largest Indian Corn-flag*.

There are some other Varieties of this Plant which are preserv'd in some curious *Botanick* Gardens, but these here mention'd are what I have observ'd in the *English* Gardens.

These are all propagated by their tuberosé Roots, which the first, second and fifth Sorts produce

produce in great Plenty, so that in a few Years, if they are suffer'd to remain unremov'd, they will spread very far, and are hardly to be entirely rooted out when they have once gotten Possession of the Ground. These Roots are in Shape very like those of the large yellow Spring *Crocus*, but are somewhat bigger, yellower within, and have a rougher outer Coat or Covering. The small Off-sets of these Roots will produce Flowers the second Year, therefore when the old Roots are transplanted, the Off-sets should be taken off from them, and planted into a Nursery-bed for one Year, by which Time they will be fit to transplant into the Borders of the Pleasure-Garden. These Roots may be taken up in *July*, when their Leaves decay, and may be kept out of the Ground until *October*; at which Time they should be planted into the Borders of the Pleasure-Garden, intermixing them amongst other bulbous-rooted Plants: But if you plant them in large Borders in Wilderness-work, (where they will thrive and flower very well) they need not be transplanted oftener than every other, or once in three Years; whereas in Borders of a Pleasure-Garden, if they were suffer'd to remain so long, they would overrun the Ground, and be very troublesome.

The third and fourth Sorts are the most valuable, producing taller Stalks and fairer Flowers; nor are these so apt to increase, which renders them fitter for the Borders of a Flower-Garden; so that since these have been introduc'd and become common, the other Sorts have been rejected, unless in some old Gardens, or for large Wilderness-Quarters, where they will grow better than the two last mention'd.

These Plants may also be propagated by Seeds, which should be sown in Pots or Tubs of light fresh Earth, soon after they are ripe: These Tubs should be plac'd where they may enjoy the Morning-Sun until eleven o' Clock, in which Position they should remain until *October*; at which Time they must be remov'd, where they may have the full Sun during the Winter-season, and the *March* following the young Plants will begin to appear; when the Boxes or Pots should have a little fine Earth sifted over the Surface of the Ground, and be removed again, where they may have only the Morning-Sun, observing, during the Time of their Growth, to refresh them with Water in dry Weather, as also to keep them clear from Weeds.

The *Michaelmas* following, if the Plants are very thick in the Pots or Boxes, you should prepare a Bed or two of light fresh Earth, in Proportion to the Quantity of your young Plants, and after levelling the Surface very even, you should spread the Earth of the Pots in which the Roots are contain'd as equal as possible upon the Beds, (for the Roots at this Time will be too small to be easily taken up) covering the Bed about half an Inch thick with light sifted Earth; and the Spring following, when the Plants begin to come up, you must stir the Ground upon the Surface to loosen it, and carefully clear the Beds from Weeds: In these Beds they may

remain (observing in the Autumn to lift some fresh Earth over the Surface) until the fourth Year, by which Time they will begin to shew their Flowers; therefore you may now observe to mark out all the best Kinds as they blow, which may the succeeding Year be transplanted into the Pleasure-Garden, but the poorer Kinds should be thrown out as not worth preserving, for the good Sorts will soon multiply and furnish you with a sufficient Stock from Off-sets.

The *Indian Corn-flag* is tender, and must be preserv'd in a warm Green-house, or a moderate Stove during the Winter-season. These Roots should be planted in Pots fill'd with a light sandy Soil. The best Time to transplant them is any Time from *May*; at which Time their green Leaves decay till *September*, that they begin to shoot again; and in *October* the Pots should be removed into the Green-house: and during their Season of Growth, which is chiefly in Winter, they must be frequently water'd, but you must not give it them in large Quantities, but during the Summer-season, if they are suffer'd to remain in the Pots, they should have little Moisture, but only be remov'd to a shady Place; for much Wet at the Time their Roots are inactive is apt to rot them.

This Plant but rarely flowers with us, but when it doth, it makes a beautiful Appearance in the Green-house, especially coming in *January*, when few other Flowers appear, which renders it worthy of a Place in every curious Garden.

GLANDIFEROUS Trees; such Trees as bear Mast, as, *Acorns*, &c.

GLANDULOUS Roots, are such Roots as grow Kernel-wise.

GLANS, is that Sort of Fruit which is contain'd within a smooth, but hard Bark, having but one Seed, its hinder Parts cover'd with a kind of Cup, the fore Part being bare, as *Acorns*; but it is properly the Fruit without the Cup.

GLASTENBURY-THORN; *vide* *Mespilus*.

GLAUCIUM, is so call'd of *γλαυκός*, *Gr.* because the Leaves of this Plant are of a Sea-Green Colour. It is call'd the *Horned Poppy*, because it is a Species of *Poppy*, having Husks resembling Horns] The Horn'd Poppy.

The Characters are;

The Cup of the Flower consists of two Leaves; the Flower hath five Leaves, which are plac'd orbicularly, and expand in form of a Rose or a Poppy, but soon fall away; the Ovary arises from the Bottom of the little Placenta, and is divided into two Parts at the Extremity; this becomes a long taper Pod, which is bivalve, having an intermediate Partition, to which are fasten'd many roundish Seeds.

The Species are;

1. **GLAUCIUM**; *flore luteo*. *Tourn.* Yellow Horn'd Poppy.

2. **GLAU-**

2. GLAUCIUM ; *flore violaceo*. Tourn. Blue-flower'd horned Poppy.

3. GLAUCIUM ; *hirsutum, flore Phœnicio*. Tourn. Hairy horned Poppy, with a deep Scarlet Flower.

4. GLAUCIUM ; *glabrum, flore Phœnicio*. Tourn. Smooth horned Poppy, with a deep Scarlet Flower.

There are some other Varieties of this Plant which occur in Botanick Authors ; but these here mentioned, are all the Sorts I have yet seen in the *English* Gardens. The first Sort is found upon the Sea Coasts in some Parts of *England* ; but if sown in a Garden, will grow very well ; this is a perennial Plant, the Roots abiding, if in a poor, dry Soil, two or three Years ; but when planted in a moist, or very rich Soil, it seldom continues longer than one Year, especially if it flowers the first Summer.

The second Sort Mr. Ray found growing amongst Corn, betwixt *Swafham* and *Burwell* in *Cambridgeshire*.

The third and fourth Sorts were brought from Abroad ; these Three are annual Plants, and either should be sown every Spring, or their Seeds suffered to scatter themselves, for the Plants will arise in *Autumn* from the Seeds which fall, and if the Winter does not prove too sharp, they will abide without any Care, and flower early the succeeding Spring : These Plants, tho' there is not much Beauty in them, yet may be permitted to have a Place in large Gardens for Variety, especially as they require very little Culture. They delight most in a warm, light Soil ; but will grow in almost any Soil, if it be not over-dunged.

GLYCYRRHIZA [is so call'd of *γλυκύς*, Sweet, and *ρίζ*, Gr. a Root, q. d. Sweet Root ; the Antients called it *Scythian Root*, because the *Scythians* first brought it into Use.] *Liquorice*.

The Characters are ;

It hath a papilionaceous Flower ; the Pointal which arises from the Empalement becomes a short Pod, containing several Kidney-shap'd Seeds ; the Leaves are placed by Pairs join'd to the Midrib, and are terminated by an odd Lobe.

The Species are ;

1. GLYCYRRHIZA ; *siliquosa, vel Germanica*. C. B. P. Common *Liquorice*.

2. GLYCYRRHIZA ; *capite echinato*. C. B. P. Rough-podded *Liquorice*.

The first of these Plants, is what the People cultivate for Use ; the other being only preserved in Botanick Gardens, amongst some other Varieties, which Plant I shall pass over with only naming, and proceed to give an Account of the Culture of the first Sort, which is the only one used.

This Plant delights in a rich, light, sandy Soil, which should be three Foot deep at least ; for the greatest Advantage consists in the Length of the Roots : The greatest Quantity of *Liquorice* which is propagated in *England*, is about *Pontefract* in *Yorkshire*, and *Godliman* in *Surrey* ; though of late Years there hath been a great deal cultivated in the Gardens near *London* : The Ground in which you in-

tend to plant *Liquorice*, should be well dug and dunged the Year before you plant it, that the Dung may be perfectly rotted and mix'd with the Earth, otherwise it will be apt to stop the Roots from running down ; and before you plant it, the Ground should be dug three Spades deep, and laid very light : When your Ground is thus well prepared, you should furnish yourself with fresh Plants taken from the Sides or Heads of the old Roots, observing that they have a good Bud or Eye, otherwise they are subject to miscarry. These Plants should be about 10 Inches long, and perfectly sound.

The best Season for planting them, is towards the End of *February* or the Beginning of *March*, which must be done in the following Manner, viz. First strain a Line cross the Ground in which you should plant them, with a long Dibble made on purpose, so that the whole Plant may be set strait into the Ground, with the Head about an Inch under the Surface in a strait Line, about a Foot asunder, or more, in Rows, and two Feet distance Row from Row ; and after having finished the whole Spot of Ground, you may sow a thin Crop of Onions, which being Plants that don't root deep into the Ground, nor spread much above Ground, will do the *Liquorice* no Damage the first Year ; for the *Liquorice* will not shoot very high the first Season, and the hoeing of the Onions will also keep the Ground clear from Weeds ; but in doing of this, you must be careful not to cut off the Top-shoots of the *Liquorice* Plants, as they appear above Ground, which would greatly injure them ; and also observe to cut up all the Onions which grow near the Heads of the *Liquorice*, and after your Onions are pulled up, you should carefully hoe and clean the Ground from Weeds ; and in *October*, when the Shoots of the *Liquorice* are decay'd, you should spread a little very rotten Dung upon the Surface of the Ground, which will prevent the Weeds from growing during the Winter, and the Rain will wash the Virtue of the Dung into the Ground, which will greatly improve the Plants.

In the beginning of *March* following, you should slightly dig the Ground between the Rows of *Liquorice*, burying the remaining Part of the Dung ; but in doing of this, you should be very careful not to cut the Roots ; this stirring of the Ground will not only preserve it clean from Weeds a long Time, but also greatly strengthen the Plants.

The Distance which I have allow'd for planting these Plants, will, I doubt not, by some, be thought too great ; but in answer to that, I would on'y observe, that as the Largeness of the Roots are the chief Advantage to the Planter, so the only Method to obtain this, is by giving them Room ; and besides, this will give a greater Liberty to stir and dress the Ground, which is of great Service to *Liquorice* ; and if the Plantation design'd, were to be of an extraordinary Bigness, I would advise the Rows to be made at least three Feet distant, whereby it will be easy to stir the

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Ground

Ground with a Breast-plough, which will greatly lessen the Expence of Labour.

These Plants should remain three Years from the Time of planting, when they will be fit to take up for Use, which should not be done until the Stems are perfectly decay'd; for when it is taken up too soon, it is subject to shrink greatly, and lose of its Weight.

The Ground near London being rich, increases the Bulk of the Root very fast; but when it is taken up, it appears of a very dark Colour, and not near so tightly as that which grows upon a sandy Soil in an open Country.

GNAPHALIUM, [takes its Name of *γναφάλιον*, Gr. Flocks, or Clipt Locks of Wool; or of *Κνέφαλον*, Gr. to Comb; because its external Down looks like Combings] Cud-weed.

The Characters are;

It hath downy Leaves; the Cup of the Flower is scaly, neither shining or specious; the Flowers are divided or cut in form of a Star.

The Species are;

1. **GNAPHALIUM**; *Anglicum*. Ger. Long-leav'd, upright Cud-weed.

2. **GNAPHALIUM**; *minus, seu herba impia*. Park. Common Cud-weed.

3. **GNAPHALIUM**; *maritimum*. C. B. P. Sea Cud-weed, or Cotton Weed.

The two first Sorts are found wild in diverse Parts of England, upon moist, stony Heaths, especially in such Places where the Water stood during the Winter. The second Sort is placed in the Catalogue of Simples annex'd to the College Dispensatory, but is not often used in Medicine: These Plants are seldom propagated in Gardens, except for the Sake of Variety; for they have no great Beauty, nor are of much Use: There are also many more of this Kind, some of which grow wild in England; but as they are never cultivated, I shall pass them over without naming, and proceed to the third Sort, which is often preserved in curious Gardens, for the Variety of its fine Silver-colour'd Leaves. This Plant is found upon the Sea Coasts of Cornwall, and some other Parts of England; but yet will rarely abide the Cold of our Winters near London, if planted in the open Air; but if it be preserved in a common Frame from the Severity of Frost, it will thrive very well: This is propagated by planting its Cuttings in any of the Summer Months, observing to water and shade them from the Violence of the Sun in the Middle of the Day, and in about two Months they will be rooted enough to transplant, at which Time you should provide a Parcel of small Pots, which should be filled with light, sandy Earth, planting your young Plants therein, shading them again until they have taken new Roots, after which they may be expos'd until the End of October, when you should remove the Pots into Shelter for the Winter-Season. But altho' I have advis'd the planting these Plants into Pots, yet if you have a Stock of them, you may plant some of them Abroad under a warm Wall, where they will stand very well in mild Winters;

but in very sharp Frosts they are generally destroy'd.

GOOSEBERRY, *vide* Grossularia.

GORZ, *vide* Genista Spinosa.

GOSSYPIMUM, *vide* Xylon.

GRAFTING: In order to Grafting, you should be provided with these Tools following.

1. A neat, small Hand-saw, to cut off the Heads of large Stocks.

2. A good strong Knife with a thick Back, to make Clefts in the Stocks.

3. A sharp Penknife to cut the Grafts.

4. A Grafting Chissel and a small Mallet.

5. Bals Strings, or woollen Yarn to tie the Grafts with, and such other Instruments and Materials as you shall find necessary, according to the Manner of Grafting you are to perform.

6. A Quantity of Clay which should be prepared a Month before it is used, and kept turn'd and mix'd like Morter every other Day, which is to be made after the following Manner;

Get a Quantity of strong, fat Loam (in proportion to the Quantity of Trees intended to be grafted) then take some new Stone-horse Dung and break it in amongst the Loam, and if you cut a little Straw or Hay very small, and mix amongst it, the Loam will hold together the better; these must be well stirred together, putting Water to them after the Manner of making Morter: It should be hollow'd like a Dish, and fill'd with Water, and kept every other Day stirr'd; but it ought to be remember'd, that it should not be expos'd to the Frost or drying Winds, and that the oftner it is stirred and wrought, the better.

There are several Ways of Grafting, the principal of which are Five.

1. *Grafting in the Rind*, called also *Shoulder Grafting*, which is only proper for large Trees; this is call'd *Crown Grafting*, because the Grafts are set in form of a Circle or Crown, and is generally perform'd about the latter End of March or the Beginning of April.

2. *Cleft Grafting*, which is also call'd *Stock* or *Slit-grafting*: This is proper for Trees or Stocks of a lesser Size, from an Inch to two Inches or more Diameter; this Grafting is to be perform'd in the Months of February and March, and supplies the Failure of the Escutcheon-way, which is practis'd in June, July and August.

3. *Whip-grafting*, which is also call'd *Tongue-grafting*: This is proper for small Stocks of an Inch, half an Inch, or less, Diameter; this is the most effectual Way of any, and that which is most in Use.

4. *Grafting by Approach*, or *Ablastation*; this is to be performed when the Stock you would Graft on, and the Tree from which you take your Graft, stand so near together, that they may be join'd: This is to be perform'd in the Month of April, and is also called *Inarching*, and is chiefly used for *Jasmines*, *Oranges*, and other tender Exotick Trees.

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The Manner of performing these several Sorts of *Grafting* being so generally known, and they having been so often describ'd in the various Books of *Husbandry* and *Gardening*, it will be needless to repeat any Thing more on that Head in this Place : I shall only take Notice in general of the several Sorts of Trees which will grow when grafted upon each other.

All such Trees as are of the same Tribe, *i. e.* which agree in their Flower and Fruit, will Take upon each other : For Instance, all the *Nut-bearing* Trees may be safely grafted on each other, as may all the *Plum-bearing* Trees, under which Head I reckon not only the several Sorts of *Plums*, but also the *Almond*, *Peach*, *Nectarine*, *Apricock*, &c. which agree exactly in their general Characters, by which they are distinguish'd from all other Trees : But as these are very subject to emit large Quantities of Gum from such Parts of the Trees as are deeply cut or wounded, which, in the tender Trees of this Kind, is more common and hurtful, so it is found to be the surest Method to *Bud* or *Inoculate* these Sorts of Fruits. Vide *Inoculation*.

Then all such Trees as bear Cones will do well upon each other, tho' they may differ in one being ever-green, and the other shedding its Leaves in Winter, as is observable in the *Cedar of Libanus*, and the *Larch-Tree*, which are found to succeed upon each other very well : But these must be grafted by Approach ; for they abound with a great Quantity of Resin, which is apt to evaporate from the *Graft*, if separated from the Tree before it be join'd with the Stock, whereby they are often destroy'd. All the *Mast-bearing* Trees will also take upon each other ; and those which have a tender soft Wood will do well if grafted in the common Way ; but those that are of a more firm Contexture, and are slow Growers, should be grafted by Approach.

By strictly observing this Rule, we shall seldom miscarry, provided the Operation be rightly perform'd, and at a proper Season, unless the Weather should prove very bad, as it sometimes happens, whereby whole Quarters of Fruit-Trees miscarry ; and it is by this Method that many Kinds of Exotick Trees are not only propagated, but also render'd hardy enough to endure the Cold of our Climate in the open Air ; for being grafted upon Stocks of the same Sort which are hardy, the *Grafts* are render'd more capable to endure the Cold ; as hath been experienc'd in most of our valuable Fruits now in *England*, which were formerly transplanted hither from more Southerly Climates, and were at first too impatient of our Cold to succeed well Abroad, but have been, by Budding or Grafting upon more hardy Trees, render'd capable of resisting our severest Cold.

And these different *Graftings* seem to have been greatly in Use among the Antients ; tho' they were certainly mistaken in the several Sorts of Fruits which they mention to have succeeded upon each other, as the *Fig* upon the *Mulberry*, the *Plum* upon the *Chestnut*,

with many others of the like Kind ; some of which I have already try'd, and find them all Mistakes, or at least they did not mean the same Plants which at present are call'd by those Names : Tho' I can't help thinking we are apt to pay too much Deference to the Writings of the Antients, in supposing them seldom to be mistaken, or to assert a Falshood : Whereas, if their Works are carefully examin'd, it will be found that they often copy'd from each other's Writings, without making Experiments to prove the Truth of their Assertions : And it is well known, that the Ranging of Plants before *Cæsalpinus's* Time (which is but about 150 Years since) was, by their outward Appearance, or from the suppos'd Virtues of them : Which Method is now justly exploded ; and it hath been observ'd, from many repeated Trials, that however Plants may resemble each other in the Shape and Make of their Leaves, Manner of Shooting, &c. that unless they agree in their Manner of Fruiting, and their other distinctive Characters, they will not grow upon each other, tho' grafted with ever so much Art.

GRANADILLA [is a Diminutive of *Granada*, or rather *Granata*, having many Grains or Kernels ; because the Fruit of this Plant is full of Seeds. It is also call'd the *Passion-Flower* ; because, if Allowance be given to Imagination, it exhibits all the Instruments of our Saviour's Passion.] *Passion-Flower*.

The Characters are ;

It hath a double Calix, the first consisting of three Leaves, the other of five Leaves, which expand in Form of a Star : The Flowers consist of five Leaves each, and are of a roseaceous Form : In the Centre of the Flower arises the Pointal, with a Crown fringed at the Bottom, but furnish'd with a tender Embryo at the Top, on which stand three Clubs, under which are the Stamina with rough, obtuse Apices, which always incline downwards : The Embryo turns to an oval or globular Fruit, fleshy, and consisting of one Cell, which is full of Seeds adhering to the Sides, and cover'd with a sort of Hood or Veil.

The Species are ;

1. **GRANADILLA** ; *pentaphyllos, latioribus foliis, flore cæruleo magno.* Boerb. Ind. Common or broad-leav'd *Passion-Flower*.
2. **GRANADILLA** ; *pentaphyllos, angustioribus foliis, flore cæruleo magno.* Narrow-leav'd *Passion-Flower*.
3. **GRANADILLA** ; *pentaphyllos, angustioribus foliis, flore minore pallidâ cæruleo serotino.* Late narrow-leav'd *Passion-Flower*, with a lesser and paler Flower.
4. **GRANADILLA** ; *Hispanis, Flos Passionis Italici.* Col. in Racch. Three leav'd *Passion-Flower*.
5. **GRANADILLA** ; *folio tricuspidate, flore parvo flavescente.* Tourn. *Passion-Flower*, with a three pointed Leaf, and a small yellowish Flower.

6. **GRANA-**

6. GRANADILLA ; *flore albo, fructu reticulato. Boerb. Ind.* White Passion-Flower, with a netted Fruit.

7. GRANADILLA ; *fatida, folio tricuspidato, flore purpureo variegato. Tourn.* Stinking Passion Flower, with a three-pointed hairy Leaf, and a purple variegated Flower, call'd by the Inhabitants of Barbadoes Love in a Mist.

8. GRANADILLA ; *fructu Citriforini, foliis oblongis. Tourn.* Passion-Flower, with a Fruit shap'd like a Citron, and an oblong Leaf, call'd by the Inhabitants of Barbadoes Water-Lemon.

9. GRANADILLA ; *latifolia, fructu maliformi.* Broad leav'd Passion-Flower, with an Apple-shap'd Fruit.

10. GRANADILLA ; *flore suave-rubente, folio bicorni. Tourn.* Passion Flower, with a Leaf divided into two Horns, and a soft red Flower.

11. GRANADILLA ; *folio amplo tricuspidi, fructu Olivæ formâ. Tourn.* Passion-Flower, with a three-pointed Leaf, and an Olive-shap'd Fruit.

12. GRANADILLA ; *folio angusto tricuspidi, fructu Olivæ formâ. Tourn.* Passion-Flower, with a narrow three-pointed Leaf, and an Olive shap'd Fruit.

13. GRANADILLA ; *Androsæmi folio, fructu Jujubino. Tourn.* Passion-Flower, with a Turfan Leaf, and a Fruit like the Jujube.

The first Sort here mention'd is the most common in all the *English* Gardens, and (notwithstanding what Mr. Bradley has affirm'd) is very different from the second and third Sorts. Nor did I ever see any Fruit upon this Kind, tho' planted in many different Soils and Situations ; whereas the second Sort rarely fails to produce Fruit every Year ; and in order to observe the Truth of this, I planted one of each Kind in the same Soil and Situation, where the second Sort has produc'd Fruit every Year since, but the first has not as yet shewn any Appearance thereof. The second Sort does also differ in the Colour of the Flower, which is somewhat paler than the first, and the Petals are not quite so blunt at their Extremities.

The third Sort has very narrow Leaves, and the young Branches are of a purplish Colour ; it is a very great Shooter, but does not flower until the Latter-end of Summer : The Flowers of this Kind are smaller, and of a paler Colour than either of the former. There is also a Variety in this Plant with yellow blotch'd Leaves, which some People preserve as a great Curiosity ; but as this Variegation is but small, and hardly to be seen in vigorous Shoots, so it is scarce worth mentioning.

These three Sorts are extreme hardy, and will endure our severest Cold in the open Air ; tho' in very hard Winters their Shoots are subject to be kill'd, and sometimes their whole Stems quite to the Surface : Yet it rarely happens that it destroys the whole Plant ; for if the Roots are permitted to continue undisturb'd, they seldom fail to shoot up again in the succeeding Summer.

These are propagated by laying down their Branches, which in one Year's time will take good Roots, and may then be remov'd to the Places where they are design'd to remain : The best Season for transplanting these Plants, is towards the latter End of *March*, or the Beginning of *April*, just before they begin to shoot ; for if they are remov'd earlier, and it should prove dry frosty Weather, with cold North-East Winds, (as it often happens in *March*) these Plants will scarcely endure it, which is the Occasion of the Death of so many of them, as is often observ'd upon Transplantation.

The Plants should be planted against a Wall or other Building, which should face the South-East or South-West ; or else intermix'd amongst flowering Shrubs in Quarters ; where, if they are regularly train'd up to Poles, they will flower extremely well, and have a very good Effect in diversifying such Plantations. The best Season for pruning of these Plants is in the Spring, after the cold Weather is past ; for if they are pruned very early, and it should happen to be frosty Weather afterwards, it would endanger most of the young Branches ; therefore it is much the better Way to let the whole Plant remain untouch'd (suffering all the rude Part to hang down before the Stem and Branches) during the Winter season, which will be of Service in protecting them from the Severity of the Cold ; and if at *Michaelmas* you lay a little Dung or other Mulch about a Foot thick upon the Surface of the Ground near the Stems, it will effectually guard their Roots from Frost ; which Method should be constantly practis'd with such as are planted in open Quarters. The Manner of Pruning is nothing more than to cut off all the small weak Shoots, and shorten the strong ones to about three Feet in Length : Or, if the Building is high against which they are planted, they may be left much longer, tho' you should be careful not to leave them too long ; for as they are vigorous growing Plants, so they will soon get above the Building, and become troublesome. Those that are planted in Quarters, and train'd to Stakes, must be cut shorter, in order to have the Flowers nearer the Ground : These, when their Season for Flowering is past, should have a little Mulch laid about their Roots, and then their Stakes may be taken away, suffering their Branches to lie upon the Ground, which will also be of Service to protect the Plants from the Injuries of the Winter ; and in the Beginning of *April*, they may be trimmed and staked up again : And when the Plants begin to shoot, they should constantly be kept train'd up to the Stakes, whereby they will not only appear handsome, but the Place will be clearer to work in, as also to pass through.

The Fruit-bearing Kind may also be propagated by sowing of the Seeds in the Spring of the Year, in Pots fill'd with light rich Earth, which should be plung'd into a moderate Hot-bed, to facilitate the Growth of the Seeds ; and when the Plants are come up, you must harden them by degrees to bear the open Air :

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In these Pots they should remain until the succeeding *Spring*, observing to shelter them in *Winter* under a Frame, or else place the Pots into the Earth under a warm Wall, to prevent their Roots from freezing through the Pots; and the Beginning of *April* you may shake them out of the Pots, and divide the Plants from each other, planting them in the Places where they are design'd to remain; or, if you have not the Ground ready, they may be put each into a separate Pot, so that they may, at any time, be turn'd out into the Ground, without disturbing their Roots; for they are difficult Plants to remove when old.

These Plants may also be planted to cover Arbors or Seats in warm situated Places, where they will flower extremely well, and answer the Purposes of those Arbors, as well as any other Plants which are at present made Use of.

The fourth Sort is somewhat tenderer than any of the former: This dies to the Surface every *Winter*, and rises again the succeeding *Spring*, and, if the Summer be warm, will produce large Quantities of Flowers, which are near as large as the common Sort, but the Petals of the Flower are narrower, and striped with Purple. This is the first Sort of *Passion-Flower* which we find describ'd in old Botanick Authors, and is what *Parkinson* has figur'd and describ'd in his *Flower-Garden*; but since the other Sorts have been brought into *Europe*, they have so much prevail'd, that this last mention'd is rarely to be found, except in some few curious Gardens. This may be increas'd by parting of the Roots, which should be done the Beginning of *April*, and must be either planted into Pots fill'd with rich light Earth, or in a good warm Border under a South-Wall, for it is subject to be destroy'd in very hard Weather. The Pots, wherein these Plants are set, may be plung'd into a gentle Hot-bed, in order to promote their taking Root, it being somewhat difficult in rooting after it is remov'd; and this will promote its flowering, provided you do not draw it too much: And by this Means also you may propagate the Plant: for, when it has made pretty strong Shoots, if you lay them down, and apply a gentle Warmth to the Pots, they will push out Roots in two or three Months time fit for transplanting, which, if done before the cold Weather comes on in Autumn, they will be settled so as to endure the *Winter*.

The Seeds of this Plant are many times brought over from *America*, (where the Plant grows in great Plenty) which, when obtain'd, may be sown in a moderate Hot-bed in the *Spring*, and treated as was before directed for the common Sort, with this Difference, *viz.* that this being more tender, should not be expos'd to the open Air so soon; and, in *Winter*, the Pots should be plung'd into an old Bed of Tanners-Bark, which has lost most of its Heat, and it should be cover'd with Glasses and Mats in very bad Weather, but, when it is mild, they should have as much open Air as possible; you must also observe not to give them much Water in *Winter*.

The fifth Sort dies to the Ground every Year, as the last, and rises again the succeeding *Spring*: This is very hardy, enduring our severest Cold in the open Ground, and increases very fast by its spreading Roots; but this seldom produces Flowers with us, and when it doth, they are so small and ill colour'd, that it scarce deserves a Place in a Garden, except for adding to the Variety.

The sixth Sort is an annual Plant with us, and requires to be rais'd upon a Hot-bed: The Seeds of this should be sow'd in *February* with *Amarantus's*, &c. And when the Plants are come up, they should be transplanted singly into small Pots fill'd with light Earth, and plung'd into a fresh Hot-bed, to bring them forward; and, in a Month's time after (when the Bed will begin to lose its Heat) you should prepare a fresh Hot-bed; then shake the Plants out of the small Pots, and put them into larger, observing to take off the Roots of the Plant which are matted round the Outside of the Ball of Earth, being careful not to break too much of the Earth from the Roots: And, after having plac'd the Plant exactly in the Middle of the larger Pot, you must fill the Pot with the like fresh light Earth, plunging the Pots into the new Bed; in which Place they may remain a Month longer, observing to water them as they shall require, as also to give them Air in Proportion to the Heat of the Weather: And when their Roots have fill'd these Pots, they should be shaken out, and transplanted into larger, giving them a little Warmth to cause them to take fresh Root the sooner; and after they are well rooted, you may remove them into the Stove, where they may be protected from the Cold of the Nights and great Rains; in which Situation they will produce great Numbers of Flowers, and ripen their Seed perfectly well. In Autumn, they commonly decay, tho' I doubt not but they would continue longer, if they were plac'd in a good Stove, and preserv'd with Care.

The seventh Sort is somewhat like the sixth, but differs therefrom in the Shape of its Leaves, which, in the sixth Sort, are long and narrow, but, in the seventh, broad and angular, approaching to the Shape of the white *Briony*, and are rougher and of a stronger Scent: The Flowers also of this are strip'd in the Middle with purple, whereas the others are all white; nor doth this Plant often produce its Flowers the first Year with us, but must be preserv'd in a warm Stove through the *Winter*, and the following Summer it will produce Flowers and perfect its Seeds.

This Plant must be sown on a Hot-bed in the *Spring*, and manag'd as was directed for the last, with this Difference only, *viz.* That, as this seldom flowers the first Summer, so those Plants which you intend to preserve through the *Winter*, should be train'd up to endure the open Air in the Summer, whereby they will be better able to live in *Winter*.

This is found in great Plenty in many Places in the *West-Indies*, where the Inhabitants call it *Love in a Mist*. The Seeds are frequently brought into *England* by that Name. *Pierre*

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Plumier

Plumier says, That he found it in great Plenty in the Hedges, in the Island of *Martinico*, where he observ'd the Flowers constantly open'd before the Rising of the Sun, after which it seldom continued an Hour. He also says, that it continues flowering almost throughout the whole Year; but that the Birds, Lizards, and Ants are so fond of this Fruit, that it is very difficult to find them intire when ripe.

The eighth Sort is a durable Plant, growing woody, and is more arborescent than any other Species of this Plant which I have yet seen. The Seeds of this are often brought over from *Barbados*, where it is cultivated in the Gardens for the Goodness of its Fruit, although the Flowers (which are finer than those of the common Sort) renders it worthy of a Place in a good Garden, had the Plant no other good Qualities to recommend it.

This Plant may be rais'd by sowing the Seeds upon a Hot-bed, as was directed for the two other Sorts, and must be afterwards transplanted into Pots, and manag'd in the same manner; but this never produces its Flowers until the second or third Year after sowing, so it must be carefully preserv'd in Winter in a warm Stove with other tender Plants which come from the same Country; but, in the Summer, it should have a good Share of free Air, especially in warm Weather, tho' it will not bear to be wholly expos'd to the open Air.

It may also be propagated by laying down some of its Branches in the Spring, which, in two Month's time, will strike Root, and may then be transplanted into Pots, and manag'd as the old Plants: During the Summer-season these Plants will require to be plentifully water'd (especially if they are kept warm) but, in Winter, they should not have too much Wet, therefore you should often refresh them, but do not give them much at each Time. The Heat, in which they thrive best in Winter, is that mark'd *Piemento*, upon Mr. *Fowler's Botanical Thermometers*; but, in Summer, they will require a much greater Share of Warmth.

I don't find any Authors who have written upon this Plant, mention its growing wild in any Parts of the *West-Indies*. *Piere Plumier* says, It is cultivated in Gardens, to cover Arbors and Seats, for the Goodness of its Fruit, which ripens in *April* and *May*, and is of a wonderful refreshing Nature, and is commonly us'd in Fevers as a Cordial Syrup, in the Stead of Rob of *Gooseberries*. The *French* call the Fruit of this Plant *Pommes de Liane*, and the *English Water Lemon*, as chiefly delighting to grow in a moist Soil. The Flowers of this Plant have a very agreeable Scent, and are extremely beautiful.

The ninth Sort also is an abiding Plant, but never becomes so woody as the former: The Stalks are commonly of a green herbaceous Colour: The Leaves are broader and shorter, but not so thick as those of the former, and of a livelier green Colour: The Flowers of this Kind are very large, and of a fine red Colour, inclining to purple, and very sweet: The Fruit is about the Size of a middling Apple, and of an agreeable Flavour.

This may also be propagated by Seeds or Layers, as the former Sort, and must be manag'd exactly in the same manner; so that I shall not repeat it here, but only observe, that this will also grow from Cuttings, if planted in a Hot-bed during any of the Summer Months.

Piere Plumier observ'd this Plant in the Isle of *St. Domingo*. It flowers there in *April*.

The tenth Sort is very common in most Parts of the *Caribbe* Islands. I have also receiv'd Seeds of it from the *Babama* Islands, from which I have rais'd Plants of this Kind that have produc'd Flowers and Fruits in the *Physick-Garden* at *Chelsea*. It requires much the same Management as the two former Sorts, tho' I could never propagate this either by Cuttings or Layers. It requires a great Share of Water, especially in the Summer-season, without which it will rarely flower; but in Winter it must have it more sparingly, tho' it will often require to be refresh'd. This delights in the same Degree of Heat with the former.

The Flowers of this Plant are very small, and of short Duration; nor is there any great Beauty in the Plant, or any Thing valuable in its Fruit to recommend it; however, it may have a Place in great Collections of Plants, to add to the Variety.

The eleventh and twelfth Sorts I have had come up in the Earth, which came from the *West-Indies*; but I have not as yet seen their Flowers: These may be preserv'd in the same Manner as the former; but delight to grow in a moist Soil, therefore must be often refresh'd with Water. Neither of these do promise to be of long Continuance, tho' I am apt to believe, they may be propagated by Layers.

The thirteenth Sort is also a perennial Plant, which is very common in divers Parts of the *West-Indies*: The Flowers of this Kind are very small, and of a greenish Colour, without Smell, and the Fruit is of a fine purple Colour when ripe. It requires the same Management as the former, and may be propagated by laying down the Branches early in the Spring.

These are all the Sorts of the *Passion-Flower* which I have, as yet, observ'd in the *English* Gardens, tho' there are some other Kinds describ'd in the Books of curious *Botanists* who have travelled in the *West-Indies*; but I have not heard of their being brought into *Europe*. As to what Mr. *Bradley* relates of his having seen above thirty different Kinds of this Plant in the *Physick-Garden* at *Amsterdam*, I cannot intirely rely upon it; for when I was there, at *Midsummer* 1727, I did not see a fourth-part of that Number, when, if they had been there, they would, at that Season, have appear'd; nor did I find their Stoves so contriv'd, as to be capable of maintaining some of the very tender Kinds, so that I am apt to think that Gentleman was mistaken in his Account.

What hath been commonly related of this Flower's representing the Crucifixion of our Saviour, is now too much exploded to need any Thing more to be said in Confutation of it,

it, since every one, who has been at the Pains to examine the Flower, and the Stories related about it, has found it was a Fiction of the *Jesuits*, who added many Things to the Figure they gave of it, and alter'd many that were really there, so as to make as lively a Representation as possible of their own fictitious Account of it; but why such Characters should be stamp'd upon the Flowers of a Parcel of Plants which were not known to grow in any other Part of the World but *America*, (which was not discover'd till many hundred Years after the Passion of our Saviour) they have not yet attempted to explain, tho', I think, it would be a Curiosity worth their Examination, since the Representation of a Transaction, to a People who never heard any thing of it, nor could have any Conception of the Matter, would be of very little Use to them: But this is besides my Business, and therefore I shall leave this Matter to those superstitious Persons who can make a Miracle of every thing that subsists in their Imaginations.

GRAPES; *vide* Vitis.

GRASS. The *English Grass* is of so good a Quality for Walks or *Grass-Plots*, that if they be kept in good Order, they have that exquisite Beauty that they cannot come up to in *France*, and several other Countries.

But Green Walks and Green Plots are, for the most part, not made by sowing the *Grass* Seed, but by laying Turfs; and indeed, the Turfs from a fine Common are much preferable to sown *Grass*.

In sowing a fine Green-plot, there is a Difficulty in getting good Seed: It ought not to be such as is taken out of a Hay-loft without Distinction; for that Seed shooting too high, and making large Stalks, the lower Part will be naked and bare, and although it be mow'd ever so often, it will never make handsome *Grass*, but on the contrary, will come to nothing but Tufts of Weeds and *Quick-Grass*, very little better than that of the common Fields.

If Walks or Plots be made by Sowing, the best Way is to procure the Seed from those Pastures where the *Grass* is naturally fine and clear, or else the Trouble of keeping of it from spiry and benty *Grass* will be very great, and it will scarce ever look handsome.

In order to sow *Grass-Seed*, the Ground must be first dug or broken up with a Spade; and when it has been dress'd and laid even, it must be very finely rak'd over, and all the Clods and Stones taken off, and cover'd over an Inch thick with good Mould to facilitate the Growth of the Seed: This being done, the Seed is to be sown pretty thick, that it may come up close and short, and it must be rak'd over again to bury and cover the Seed, that if the Weather should happen to be windy, it may not be blown away.

As to the Season of sowing *Grass*, the latter End of *August* is a good Time, because the Seed naturally requires nothing but Moisture to make it grow: If it be not sown till the latter End of *February*, or the Beginning of

March, if the Weather proves dry, it will not so soon make the Walks or Quarters green. It is also best to sow it in a mild Day, and inclining to Rain, for that, by sinking down the Seed in the Earth, will cause it to shoot the sooner.

After the Seed is well come up, and the *Grass* is very thick, and of a beautiful Green, it will require a constant Care to keep it in Order: This consists in mowing the *Grass* often; for the oftener it is mow'd, the thicker and handsomer it grows: It must also be roll'd with a Cylinder, or Roller of Wood, Stone, or Iron, to level it as much as possible.

If *Grass* be neglected, it will run into *Quick-Grass* and *Weeds*; and if it does so, there is no Way to recover it, but either by sowing it, or laying it over again, and that once in every two Years; but if the Ground be well clear'd from the Roots of strong Weeds, and the Turf be taken from a fine level Common, it will continue handsome for several Years, provided it be well kept.

In order to keep *Grass Plots* or *Walks* handsome and in good Order, in Autumn you may sow some fresh Seed over any Places that are not well fill'd, or where the *Grass* is dead, to renew and furnish them again.

GRAVEL and *Grass* are natural Ornaments to a Country-Seat, and are the Glory of the *English* Gardens, and Things by which we excel all other Nations, as *France*, *Holland*, *Flanders*, &c.

There are different Sorts of *Gravel*; but for those who can conveniently have it, I approve of that *Gravel* on *Black-Heath*, as preferable to most that we have in *England*, it consisting of smooth, even Pebbles, which, when mix'd with a due Quantity of Loam, will bind exceeding close, and look very beautiful, and continue handsome longer than any other Sort of *Gravel* which I have yet seen.

Some recommend a Sort of Iron-mould *Gravel*, or *Gravel* with a little binding Lime amongst it, than which nothing, they say, binds better when it is dry; but in wet Weather it is apt to stick to the Heels of one's Shoes, and will never appear handsome.

Sometimes Loam is mix'd with *Gravel* that is over sandy or sharp, which must be very well blended together, and let lie in Heaps; after which it will bind like a Rock.

There are many Kinds of *Gravel* which do not bind, and thereby cause a continual Trouble of rolling, to little or no Purpose: As for such,

If the *Gravel* be loose or sandy, you should take one Load of strong *Loam*, and two of *Gravel*, and so cast them well together.

If it be an old Walk, that only wants coating over, it will be sufficient to lay it two or three Inches thick: But where there is plenty of this strong reddish Loam, then you may lay it the full Depth.

Some skreen the *Gravel* too fine, but this is an Error; if it be cast into a round Heap, and the great Stones only rak'd off, it will be the better.

Some

Some are apt to lay Gravel Walks too round ; but this is likewise an Error, because they are not so good to walk upon, and besides, it makes them look narrow ; an Inch is enough in a Crown of five Foot, and it will be sufficient, if a Walk be ten Foot wide, that it lies two Inches higher in the Middle than it does on each Side ; if fifteen Feet, three Inches ; if twenty Feet, four ; and so in Proportion.

For the Depth of Gravel Walks, six or eight Inches may do well enough ; but a Foot Thickness will be sufficient for any.

The Month of *March* is the properest Time for laying Gravel ; it is not prudent to do it sooner, or to lay Walks in any of the Winter Months before that Time.

Some, indeed, turn up Gravel Walks in Ridges in *December*, in order to kill the Weeds, but this is very wrong ; for besides that it deprives them of the Benefit of them all the Winter, it does not answer the End for which it is done, but rather the contrary ; for tho' it does kill the Weeds for the present, yet it adds a Fertility to them as to the great future Increase of both them and Grass.

If constant rolling them after Rains and Frost will not effectually kill the Weeds and Moss, you should turn the Walks in *April*, and lay them down at the same time.

In order to destroy Worms that spoil the Beauty of Gravel or Grassy Walks, some recommend the watering them well with Water, in which Walnut-Tree Leaves have been steep'd and made very bitter, especially those Places most annoy'd with them ; and this, they say, as soon as it reaches them, will make them come out hastily, so that they may be gather'd ; but if in the first laying of the Walks there is a good Bed of Lime-rubbish laid in the Bottom, it is the most effectual Method to keep out the Worms ; for they don't care to harbour near Lime.

Grounds that are gravelly and sandy, easily admit both Heat and Moisture ; but they are not much the better for it ; because they let it pass too soon, and so contract no Ligature ; or else, if they have a clayey Bottom, they retain it too long, and by that Means either parch or chill too much, and produce nothing but Moss or cancerous Infirmities ; but if the Bottom be a Gravel, and there are two Feet of good Earth upon the Surface, it is preferable to most other Soils for almost any Sort of Fruit ; for tho' this Soil will not produce the Fruits planted thereon, so large as a loamy Soil, yet they will be much better tasted, and earlier ripe.

GRAVITY, is by some call'd *Vis centripeta*, and is that Quality by which all heavy Bodies tend towards the Center of the Earth, accelerating the Motion the nearer they move towards it.

Gravity is also defin'd more generally, the natural Tendency of one Body towards another ; and by others more generally still, the mutual Tendency of each Body, and each Particle of a Body towards all others ; and in

this Sense it coincides with what is more usually call'd *Attraction*.

The Terms *Gravity*, *centripetal Force*, *Weight* and *Attraction*, do, in effect, all denote the same Thing, only in different Views and Relations.

In Propriety, *Gravity*, *Force of Gravity*, or *Gravitating Force*, is when we consider a Body as tending towards the Earth.

Centripetal Force, is the same Force as the former, when we consider it as immediately tending to the Center of the Earth.

Attraction, or *Attractive Force*, is the same as the former, when we consider the Earth or Body towards which it tends.

Weight is the Name we give to it, when we consider it in respect to an Obstacle or Body, in the Way of its Tendency upon which it acts.

It is a Law of Nature long observed, that all Bodies near the Earth, have a *Gravity* or Tendency towards the Center of the Earth, which Law the Moderns, and the immortal Sir *Isaac Newton* have found from certain Observations, to be much more extensive, and to hold universally with respect to all the known Bodies in Nature.

It is now therefore a Principle, or Law of Nature, that all Bodies, and all the Particles of all Bodies, gravitate towards each other mutually. From which single Principle Sir *Isaac Newton* has happily deduc'd all the great Phenomena of Nature.

There is a two-fold *Gravity* of all Bodies, considered within the Confines of any Fluid, viz. *True*, *Absolute* and *Apparent*, *Vulgar* or *Comparative*.

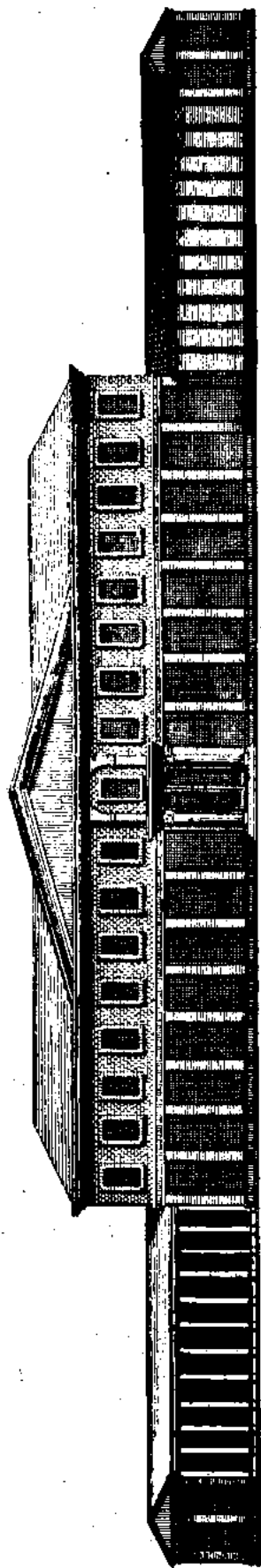
Absolute Gravity, is the whole Force by which any Body tends downwards.

Vulgar, or *Relative Gravity*, is the Excess of *Gravity* in one Body above the *Specific Gravity* of the Fluid, by which it tends downwards more than the ambient Fluid does.

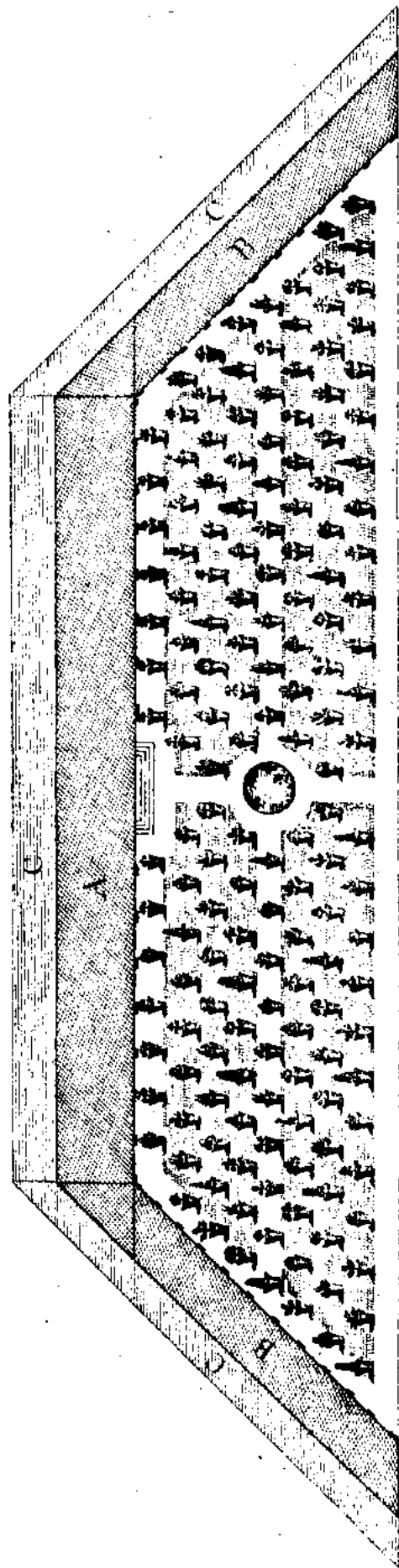
As to *Absolute Gravity*, the Parts of all Fluids and all Bodies, do really gravitate in their proper Places, and by their joint Weight, make the Weight of the Whole ; for every heavy Whole is a heavy Body, and the Weight of any Whole is equal to the Weight of all its Parts ; because compounded of them.

The *Vulgar* or *Relative Gravity* is such, that in reference to it, Bodies do not gravitate in their Places, or rather do not pregravitate, when compar'd with one another ; but by hindring one another in their mutual Endeavour to descend, do remain in their proper Places, as if they were not at all heavy.

People in common suppose, that those Things which do not *Pregravitate* in the Air, Water, &c. have no *Gravity* at all, and only conclude those to be heavy Bodies, which they see pregravitate or descend, because they cannot be born up by the ordinary Gravitation of the Fluid, or by its Pressure all manner of Ways : So that among the common People, the Notion of Weight is only the Excess of the Weight of any Body above that of Air, and those Things are accounted light, which because they are less heavy than Air, are borne or buoy'd up by it ; whereas those Bodies



The Upright of the Greenhouse and Stores.



A. The Ground plot of the Greenhouse. B. The Ground plot of the Stores. C. The Sheds behind the Stores and Greenhouse.

place this cut at C.

A. B. C. delin. S. J. G. 1840.

Bodies comparatively light, are not really so, since it has been found by Experiment *in vacuo*, that they descend as fast as other Bodies do in Air.

The Properties of *Gravity* are as follow;

1st, That all Bodies do descend towards a Point, which is either the Center of Magnitude of the Earth and Sea, about which the Sea forms itself into a spherical Surface, or is very near it.

2dly, This Point or Center is fixed within the Earth.

3dly, The Force of *Gravity* is nearly equal in all Places equidistant from the Center of the Earth: But indeed all Places of the Surface of the Earth are not at equal Distance from the Center, because the Equatorial Parts are something higher than the Polar Parts.

4thly, *Gravity* affects all Bodies equally, without regard either to their Bulk, Figure or Matter; so that abstracting from the Resistance of the Medium, the most compact and loose, the greatest and smallest Bodies would descend equal Spaces in equal Times, as appears from the Quickness of the Descent of very light Bodies in an exhausted Receiver.

Whence we may observe a very great Difference between *Gravity* and *Magnetism*; *Gravity* affecting all Bodies alike, and *Magnetism* affecting only Iron, and that towards its Poles.

And hence we may also conclude, that there is no positive *Levity*; for that those Things which do seem to be light, are only so comparatively; and whereas several Things swim and rise in Fluids, the Cause is only because they are not so heavy as those Fluids, Bulk for Bulk.

There is no Reason that Cork should be said to be light, because it floats upon Water, more than Iron, by reason that will float on Mercury.

5thly, This Power increases in descending Bodies towards the Center of the Earth, in Proportion to the Squares of the Distances therefrom reciprocally; and also decreases in ascending, in the same Proportion, so as at a double Distance, to have but a quarter of the Force, &c.

This appears very agreeable to Reason, because the gravitating or attracting Power must of necessity be excited more feebly in a greater Sphere, and more vigorously in a small Sphere, in Proportion as it is expanded or contracted.

So that the Surfaces of Spheres being to one another as the Squares of the Radii, the Power of them at several Distances will be reciprocally as the Squares of those Distances, and then the whole of its Action upon each spherical Surface, whether it be great or small, will be always equal.

6thly, As all Bodies gravitate towards the Earth, so does the Earth equally gravitate towards all Bodies, *i. e.* the Action of *Gravity* is mutual on each Side, and equal.

Hence also the attractive Powers of Bodies, at equal Distances from the Center, are as the Quantities of Matter in the Bodies.

Hence also, the attractive Force of entire Bodies, consists of the attractive Force of the Parts; for by the adding or taking away any Part of the Matter of a Body, its *Gravity* is increased or diminished in Proportion to the Quantity of such Particles to the entire Mass.

To this Property of *Gravity*, perhaps, is owing the alternate Motion of the Sap in Vegetables, which may be accounted for from the Alternacies of the Day and Night, Warm and Cold, Moist and Dry; for it is very probable that the Sap in Plants does in some measure recede from the Tops of their Branches, as the Sun leaves them; because its rarefying Power then ceasing, the greatly rarefied Sap, and Air mix'd with it, will condense and take up less Room than they did, and the Dew and Rain will then be strongly imbibed by the Leaves, which mixing with the included Sap, will render it too heavy to be sustain'd by the Pressure of the Air upon the Surface of the Plant, or by any constricting Quality of the containing Vessels, so that it recedes downwards until it meets with an equal Resistance, whereby it is suspended until the Return of Warmth, which rarefies the Sap, and renders it specifically lighter than before, and so mounts again to the Extremity of the Branches, and part of it, by being render'd extremely light, passes off thro' the Pores of the Plant, and is evaporated.

GREEN-HOUSE or Conservatory.

As of late Years there have been great Quantities of curious Exotick Plants introduc'd into the *English* Gardens, so the Number of *Green-houses* or *Conservatories* has increased, and not only a greater Skill in the Management and Ordering of these Plants, has increased therewith; but also a greater Knowledge of the Structure and Contrivance of these Places, so as to render them both Useful and Ornamental, hath been acquired: And since there are many Particulars to be observ'd in the Construction of these Houses, whereby they will be greatly improv'd, so I thought it necessary, not only to give the best Instructions for this I was capable of; but also to give a Design of one in the Manner I would chuse to erect it, upon the annex'd Copper Plate.

As to the Length of these Houses, that must be proportion'd to the Number of Plants they are to contain, or the Fancy of the Owner; but their Depth should never be greater than sixteen or eighteen Feet in the Clear, and the Length of the Windows should be at least equal to the Depth of the House, and if they are somewhat longer, it will be still the better: These Windows should be carried up quite to the Ceiling, that there may be no Room for dead Air in the upper Part of the House; and they should come down within about ten Inches or a Foot of the Floor; their Breadth should be proportion'd to the Length of the House; which in a small *Green-house*, may be four Feet broad; but in a large one, they should be six Feet: The Piers between these

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these

these Windows should be as narrow as possible to support the Building; for which Reason, I should chuse to have them either of Stone, or of solid Oak: for if they are built with fine rubb'd Bricks, those are generally so soft, that the Piers will require to be made thicker, otherwise the Building will be in danger of falling in a short Time, especially if you have any Rooms over the *Green-house*: which is what I would always advise, as being of great Use, to keep the Frost out in very hard Winters. If these Piers are made with Stone, I would have them about twenty Inches broad in Front, and stop'd off backward to about ten Inches broad, whereby the Rays of the Sun will not be taken off or obstructed by the Corners of the Piers; which it would be, if they were square. And if they were made of solid Oak, eighteen Inches square would be strong enough to support the Building: but these I would also advise to be stop'd off in the Manner directed for the Stone.

At the Back of the *Green-house* there may be erected a House for Tools, and many other Purposes, which will be extreme useful, and also prevent the Frost from entering the House that Way; so that the Wall between these need not be more than two Bricks in Thickness; whereas if it were quite expos'd behind, it should be two Bricks and an half, or three Bricks in Thickness: and by this Contrivance, if you are willing to make a handsome Building, and to have a noble Room over the *Green-house*, you may make the Room to come over the Tool-house, and carry up the Stair-case in the Back, so as not to be seen in the *Green-house*; and hereby you may have a Room twenty or twenty-two Feet in Width, and of a proportionable Length: and under this Stair-case there should be a private Door into the *Green-house*, at which the Gardener may enter in hard-frosty Weather, when it will not be safe to open any of the Glasses in the Front. The Floor of the *Green-house*, which should be laid either with Marble, Stone, or Broad Tiles, according to the Fancy of the Owner, must be rais'd two Feet above the Level of the Ground whereon the House is plac'd, which, if in dry Ground, will be sufficient: but if the Situation be moist and springy, and thereby subject to Damps, it should be rais'd at least three Feet above the Surface: And under the Floor, about two Feet from the Front, I would advise a Flue of about ten Inches in width, and two Feet deep, to be carry'd the whole Length of the House, which may be return'd along the Back-part, and be carry'd up in proper Funnel's adjoining to the Tool-house, by which the Smoak may pass off. The Fire-place may be contriv'd at one End of the House; and the Door at which the Fuel is put in, as also the Ash-grate, may be contriv'd to open into the Tool-house, so that it may be quite hid from the Sight, and be in the Dry; and the Fuel may be laid in the same Place, whereby it will be always ready for Use.

I suppose many People will be surpriz'd to see me direct the making of Flues under a *Green-house*, which have been disus'd so long, and by most People thought of ill Consequence; as indeed they have often prov'd, when under the Direction of unskilful Managers, who have thought it necessary, whenever the Weather was cold, to make Fires therein. But however injurious Flues have been under such Mismanagement, yet when skilfully manag'd, they are of very great Service: for tho' perhaps it may happen that there will be no Necessity to make any Fires in 'em for two or three Years together, as when the Winters prove mild there will not, yet in very hard Winters they will be extremely useful to keep out the Frost; which cannot be effected any other Way, but with great Trouble and Difficulty.

Within-side of the Windows, in Front of the *Green-house*, you should have good strong Shutters, which should be made with Hinges, to fold back, so that they may fall back quite close to the Piers, that the Rays of the Sun may not be obstructed thereby: These Shutters need not to be above an Inch thick, or little more, which, if made to join close, will be sufficient to keep out our common Frost; and when the Weather is so cold as to endanger the freezing in the House, it is but making a Fire in your Flue, which will effectually prevent it: And without this Convenience it will be very troublesome, as I have often seen, where Persons have been oblig'd to nail Mats before their Windows, or to stuff the hollow Space between the Shutters and the Glass with Straw; which when done, is commonly suffer'd to remain till the Frost goes away; which, if it should continue very long, the keeping the *Green-house* so closely shut up, will prove very injurious to the Plants: And as it frequently happens that we have an Hour or two of the Sun-shine in the Middle of the Day, in continued Frosts, which are of great Service to Plants, when they can enjoy the Rays thereof through the Glasses, so when there is nothing more to do than to open the Shutters, which may be perform'd in a very short Time, and as soon shut again when the Sun is clouded, the Plants may have the Benefit thereof whenever it appears; whereas where there is so much Trouble to uncover, and as much to cover again, it would take up the whole Time in uncovering and shutting them up, and thereby the Advantage of the Sun's Influence would be lost. Besides, where there is so much Trouble requir'd to keep out the Frost, it will be a great Chance if it be not neglected by the Gardener; for if he be not as fond of preserving his Plants, and as much in love with 'em as his Master, this Labour will be thought too great by him; and if he does take the Pains to cover the Glasses up with Mats, &c. he will not care to take them away again until the Weather alters, so that the Plants will be shut up close during the whole Continuance of the Frost.

There

There are some People who commonly make use of Pots fill'd with Charcoal to set in their *Green-house* in very severe Frosts; but this is very dangerous to the Persons who attend these Fires, and I have often known such as have been almost suffocated therewith, and at the same time they are very injurious to the Plants; nor is the Trouble of tending upon these, small, and the many Hazards to which the Use of these Fires are liable, have justly brought them into Disuse with all skilful Persons: And as the Contrivance of Flues, and the Charge of the Fires are but small, so they are much to be preferr'd to any other Method for warming the Air of the House.

The Back-part of the House should be plaister'd with Mortar, and white-wash'd; or if lined with Wainscot, should be painted white, as should the Ceiling, and every Part within-side of the House, for this reflects the Rays of Light in a much greater Quantity than any other Colour, and is of signal Service to Plants, especially in the Winter, when the House is pretty much clos'd, so that but a small Share of Light is admitted through the Windows; and at such time I have observ'd that in some *Green-houses* which have been painted Black, or of a dark Colour, the Plants have cast most of their Leaves.

In this *Green-house* you should have Trussels, which may be mov'd out and in to the House, upon which you should place Rows of Planks, so as to fix the Pots or Tubs of Plants in regular Rows one above another, whereby the Heads of the Plants may be so situated as not to interfere with each other: The lowest Row of Plants, which should be the forwardest towards the Windows, should be plac'd about four Feet therefrom, so that there may be a convenient Breadth left next the Glasses to walk in Front; and the Rows of Plants should rise gradually from the first, in such a manner, that the Heads of the second Row should be intirely advanc'd above the first, the Stems only being hid thereby: And at the Back-side of the House there should also be allow'd a Space of at leaſt five Feet, for the Convenience of watering the Plants, as also to admit of a Current of Air round them, that the Damps occasion'd by the Perspiration of the Plants, may be the better dissipated, which by being pent in too closely, often occasions a Mouldiness upon the tender Shoots and Leaves; and when the House is close shut up, this stagnating, rancid Vapour is often very destructive to the Plants: For which Reason also you should never crowd them too close to each other; nor should you ever place *Sedums*, *Euphorbiums*, *Torch-Thistles*, and other tender succulent Plants, amongst *Oranges*, *Myrtles*, and other Ever-green Trees; for, by an Experiment which I made *Anno 1729*, I found that a *Sedum* plac'd in a *Green-house* among such Trees, almost daily increas'd its Weight, although there was no Water given to it the whole Time: Which Increase of Weight was owing to the Moisture imbib'd from the Air, which being replete with the rancid Vapours perspir'd from the other Plants, occasion'd the

Leaves to grow pale, and in a short Time they decay'd and dropp'd off; which I have often observ'd has been the Case with many other succulent Plants, when plac'd in those Houses which were fill'd with many Sorts of Ever-green Trees, that requir'd to be frequently water'd.

Therefore to avoid the Inconvenience which attends the placing of Plants of very different Natures in the same House, it will be very proper to have two Wings added to the main *Green-house*; which if plac'd in the Manner express'd in the annex'd Plan, will greatly add to the Beauty of the Building, and also collect a greater Share of Heat. In this Plan the *Green-house* is plac'd exactly fronting the South, and one of the Wings faces the South-East, and the other the South-West; so that from the Time of the Sun's first Appearance upon any Part of the Building, until it goes off at Night, it is constantly reflected from one Part to the other, and the cold Winds are also kept off from the Front of the main *Green-house* hereby; and in the Area of this Place, you may contrive to place many of the most tender Exotick Plants, which will bear to be expos'd in the Summer-season; and in the Spring, before the Weather will permit you to set out the Plants, the Beds and Borders of this Area may be full of *Anemonies*, *Ranunculus's*, early *Tulips*, &c. which will be past flowering, and the Roots fit to take out of the Ground by the Time you carry out the Plants, which will render this Place very agreeable during the Spring-season that the Flowers are blown; and here you may walk and divert your self in a fine Day, when, perhaps, the Air in most other Parts of the Garden will be too cold for Persons, not much us'd thereto, to take Pleasure in being out of the House.

In the Center of this Area, may be contriv'd a small Basin for Water, which will be very convenient for watering Plants, and very much add to the Beauty of the Place: besides, the Water being thus situated, will be soften'd by the Heat, which will be reflected from the Glasses upon it, whereby it will be render'd much better than raw cold Water for these tender Plants.

The two Wings of the Building should be contriv'd so as to maintain Plants of different Degrees of Hardiness, which must be effected by the Situation and Extent of the Fire-place, and the Manner of conducting the Flues; a particular Account of which will be exhibited under the Article of *Stove*: But I would here observe, that the Wing facing the South-East, should always be preferr'd for the warmest Stove, its Situation being such, as that the Sun upon its first Appearance in the Morning, shines directly upon the Glasses, which is of great Service in warming the Air of the House, and adding Life to the Plants, after having been shut up during the long Nights in the Winter-season. These Wings being, in the Draught annex'd, allow'd sixty Feet in Length, may be divided in the Middle by Partitions of Glass, with Glass-doors to pass from one to the other, and the Fire-place may be order'd so as to

to warm both Divisions, by placing a Regulator of Iron in the Flue, so that the Smoke may pass thro' the Flues of which Part soever you please; and by this Contrivance you may keep such Plants as require the same Degree of Heat in one Part of the House, and those which will thrive in a much less Warmth in the other Part; but this will be more fully explain'd under the Article of *Stoves*.

The other Wing of the House, facing the South-West, may also be divided in the same manner, and Flues carry'd through both Parts, which may be us'd according to the Seasons, or the particular Sorts of Plants which are plac'd therein; so that here will be four Divisions in the Wings, each of which may be kept up to a different Degree of Warmth, which, together with the *Green-house*, will be sufficient to maintain Plants from all the several Countries of the World: And without having these several Degrees of Warmth, it will be impossible to preserve the various Kinds of Plants from the several Parts of *Africa* and *America*, which are annually introduc'd into the *English* Gardens; for when Plants from very different Countries are plac'd in the same House, some are destroy'd for want of Heat, while others are forc'd and spoil'd by too much of it; and this is often the Case in many Places, where there are large Collections of Plants.

But besides the Conservatories here mention'd, it will be proper to have a deep Hot-bed Frame (such as is commonly us'd to raise large Annuals in the Spring;) into which may be set Pots of such Plants as come from *Carolina*, *Virginia*, &c. while the Plants are too small to plant in the open Air, as also many other Sorts from *Spain*, &c. which require only to be screen'd from the Violence of Frosts, and should have as much free Air as possible in mild Weather, which can be no better effected than in one of these Frames, where the Glasses may be taken off every Day when the Weather will permit, and put on every Night; and in hard Frosts, the Glasses may be cover'd with Mats, Straw, Pease-haulm, or the like, so as to prevent the Frost from entering the Pots to freeze the Roots of the Plants, which is what will many times utterly destroy them, tho' a slight Frost pinching the Leaves or Shoots very seldom does them much Harm. As to the Structure of these Frames, it will be fully explain'd under the Article of *Hot-beds*.

GROSSULARIA; [so call'd from the gross or thick Skin of the Fruit, because the Skin of this Shrub is carnosé and fleshy: It is also call'd *Uva*, because the Fruit resembles a *Grape*; and *Crispa*, because it is villose and hairy: It is said to be *acino simplici*, because its Berries are distinct one from another, and do not grow in Clusters.] The Gooseberry-Tree.

The Characters are;

The Leaves are lacinated, or jagged; the whole Plant is set with Prickles; the Fruit grows sparsely upon the Tree, having, for the most part, but one Fruit upon a Footstalk, which is of an Oval or Globular Figure, containing

many small Seeds, surrounded by a pulpy Substance.

The Species are;

1. **GROSSULARIA**; *simplici acino, vel spinosa, sylvestris*. C. B. P. The common Gooseberry.
2. **GROSSULARIA**; *spinosa, sativa*. C. B. P. The large manur'd Gooseberry.
3. **GROSSULARIA**; *fructu obscure purpurascente*. Clus. The red hairy Gooseberry.
4. **GROSSULARIA**; *five Uva Crispa, alba, maxima, rotunda*. Hort. Ed. The large white Dutch Gooseberry.
5. **GROSSULARIA**; *maxima, subflava, oblonga*. Hort. Ed. The large Amber Gooseberry.
6. **GROSSULARIA**; *fructu rotundo, maximo, virecente*. The large green Gooseberry.
7. **GROSSULARIA**; *fructu rubro, majore*. Boerb. Ind. The large red Gooseberry.
8. **GROSSULARIA**; *spinosa sativa, foliis flavescens*. The yellow-leav'd Gooseberry.
9. **GROSSULARIA**; *spinosa sativa, foliis ex luto variegatis*. The strip'd-leav'd Gooseberry.

There are several other Varieties of this Fruit which have been obtain'd from Seeds in different Parts of *England*, which differ either in the Shape or Colour of the Berries; but as these are only seminal Variations, so it is needless in this Place to enumerate them, especially since the Number of these will be increas'd continually from Seeds.

These are propagated either by Suckers taken from the old Plants, or by Cuttings; the latter of which I prefer to the former, because those Plants which are produc'd from Suckers, are always more dispos'd to shoot out a greater Number of Suckers from their Roots than such as are raised from Cuttings, which do generally form much better Roots.

The best Season for planting these Cuttings is in *February*, just before their Buds begin to open; observing always to take the hand-somest Shoots, and from such Branches as generally produce the greatest Quantity of Fruit; for if you take those which are produc'd from the Stem of the old Plants, (which are commonly very luxuriant) they will not be near so fruitful as those taken from bearing Branches: These Cuttings should be about six or eight Inches long, and must be planted in a Border of light Earth expos'd to the Morning Sun, about three Inches deep, observing to water them gently, when the Weather proves dry, to facilitate their taking Root; and in the Summer, when they have put out, you should rub off all the under Shoots, leaving only the uppermost or strongest, which should be train'd upright to form a regular Stem. In *October* following, these Plants will be fit to remove; at which Time you should prepare an open Spot of fresh Earth, which should be well dug and cleans'd from all noxious Weeds, Roots, &c. and being levell'd, you should proceed to take up your Plants, trimming their Roots, and cutting off all lateral Side-branches; then plant them at three Feet Distance Row from Row, and one Foot asunder in the Rows, observing

serving to place some short Sticks to the Plants in order to train their Stems upright and regular. In this Place they may remain two Years, being careful to keep them clear from Weeds, as also to dig up the Ground between the Rows once a Year, which should be in the Spring; as also to trim off all lateral Shoots which are produc'd below the Head of the Plant, so that the Stem may be clear about a Foot in Height above the Surface of the Earth, which will be full enough; and as the Branches are produc'd commonly very irregular in the Head, so you must cut out such of them as cross each other, or ruin them where they are too close, whereby the Head of the Plant will be open, and capable of admitting the Air freely into the Middle, which is of great Use to all kinds of Fruits.

After these Plants have remain'd in this Nursery two Years, they will be fit to transplant to the Places where they are design'd to remain, for it is not so well to let them grow in the Nurseries too large, which will occasion their Roots to be woody, whereby the Removing of them will not only hazard the Growth of the Plants, but such of them as may take very well, will remain stunted for two or three Years before they will be able to recover their Check. The Soil in which these Plants thrive to the greatest Advantage, is a rich, light, sandy Loam, though they will do very well upon most Soils and Situations: But where this Fruit is cultivated, in order to procure it in the greatest Perfection, they should never be planted in the Shade of other Trees, but must have a free open Exposure: The Distance they ought to be planted, is eight Feet Row from Row, and six Feet asunder in the Rows: The best Season for transplanting them, is in *October*, when their Leaves begin to decay, observing, as was before directed, to prune their Roots, and trim off all lateral Shoots, or such as cross each other, shortening all long Branches, so as to make the Head regular.

In the pruning of these Shrubs, most People make use of Garden-Sheers, observing only to cut the Head round, as is practis'd for Evergreens, &c. whereby the Branches become so much crowded, that what Fruit is produced, never grows to half the Size as it would do, were the Branches thin'd and prun'd according to Art; which should always be done with a pruning Knife, shortning the strong Shoots to about ten Inches, and cutting out all those which grow irregular, and thinning the fruit-bearing Branches where they are too thick; observing always to cut behind a Leaf-bud: With this Management, your Fruit will be near twice as large as those which are produced upon such Bushes as are not thus pruned, and the Shrubs will continue in Vigour much longer; but you must observe to keep the Ground clear from Weeds, and dig it at least once a Year, and every other Year you should bestow a little rotten Dung upon it, which will greatly improve the Fruit.

It is a common Practice with the Gardeners near *London*, who have great Quantities of

these Bushes, in order to supply the Markets; to prune them soon after *Michaelmas*, and then to dig up the Ground between the Rows, and plant it with Coleworts for Spring Use, whereby their Ground is employed all the Winter without prejudicing the Gooseberries, and in hard Winters these Coleworts often escape, when those which are planted in an open Exposure, are all destroy'd; and these are generally pull'd up for Use in *February* or *March*, so that the Ground is clear before the Gooseberries come out in the Spring, which is a Piece of Husbandry well worth practising where Ground is dear, or where Persons are confin'd for Room.

GUAJACANA; Indian Date Plumb, or Bastard Lote Tree.

The Characters are;

The Leaves are produced alternately upon the Branches, which fall off in Winter; the Cup of the Flower is divided into three Parts; the Flower consists of one Leaf of a Bell shape, the under Part being tubulose, and the upper Part is cut into five or more Segments, and is expanded; in the Center of the Cup arises the Ovary, which becomes a soft, roundish Fruit, having many depress'd Cells, in which are contained many hard Seeds dispos'd in a circular Order.

The Species are;

1. **GUAJACANA**; *J. B.* The Indian Date Plumb-tree.

2. **GUAJACANA**; *angustiore folio.* *Tourn.* Narrow-leav'd Indian Date Plumb-tree.

3. **GUAJACANA**; *Pisshamin Virginianum.* *Park. Theat. Boerb. Ind.* Virginian Date-Plumb, or Pisshamin.

The first and second Sorts are at present very rare in *England*, and only to be found in some curious Gardens; but the third Sort is more common; they are all supposed to be Natives of the *West Indies*: The last Sort hath been raised in great Plenty, of late Years, in the Gardens near *London*, from Seeds which have been brought from *Virginia* and *Carolina*, in both which Countries this Tree greatly abounds.

These Plants may be propagated by sowing the Seeds (which are often brought into *England*) upon a moderate Hot-bed, in the Spring of the Year, and when the Plants come up, they should be transplanted each into a separate Half-penny Pot, which should be filled with fresh, light, sandy Earth, and plunged into another moderate Hot-bed, to facilitate their taking Root; and as the Summer advances, so you should inure them to the open Air by degrees, and in *June* they may be removed into some Place that is pretty well shelter'd from Winds, where they may remain until *October*, at which time they should be removed under the Shelter of a Hot-bed Frame, or into the Green-house, during the first Winter; but in *April* following, they may be shaken out of the Pots and transplanted into the open Air, where they will thrive very fast, and resist the Cold of our Winters very well, provided they are planted in a dry Soil,

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Soil, and not too much expos'd to severe Winds.

They may also be propagated by laying down the young Shoots in the *Spring*, which if kept supplied with Water in very dry Weather, will take Root by the succeeding *Spring*, when they may be transplanted where they are to remain: The best Season for transplanting these Trees is at the latter End of *March*, just before they begin to shoot, at which Time, if Care be taken not to hurt their Roots, there will be little Danger of their not succeeding, if the Plants are young; but they are very difficult to remove when they are grown large; therefore if your Ground be not ready to transplant these Trees into, while young, you should keep them in Pots or Tubs, until it be so, that they may be turned out with a Ball of Earth to their Roots, which will be much the surest Method.

The *Pisbamin* is very subject to send forth great Numbers of Suckers from the Root, so that there will never want a Supply of Shoots for Laying; which is by far the best Method of managing them; tho' sometimes they may be taken from the old Plants with Roots to them; yet these Roots are seldom very good, and will always be subject to push out a greater Quantity of Suckers, than such as are produc'd by Layers; which is what no one would covet in any Sort of Trees, unless for the sake of increasing the Number; for they seldom make such fair Trees as the other. This makes a very large beautiful Tree in *Virginia*, and seems dispos'd to grow to the same Stature with us. There was formerly a large Tree of this Kind in the Gardens of the Bishop of *London* at *Fulham*, which flower'd; but this hath been cut down several Years, to make Room for Kitchen Stuff: so that at present I don't know of any that are very large; tho', in a few Years, those that have been rais'd from Seeds will come to flower; for there are some Trees in the *Physick-Garden*, that I rais'd from Seeds in the Year 1724, which are at this Time, *Anno* 1729, upwards of nine Feet high, and do make vigorous Shoots every Year.

GUAIAACUM; Lignum Vitæ.

The Characters are;

It hath pinnated Leaves: The Flower consists of several Petals, which are plac'd orbicularly, and expand in Form of a Rose: The Pointal of the Flower, which arises from the Centre of the Calyx, becomes a fleshy, roundish, stony Fruit, or the stony Seeds are surrounded with a thin Pulp.

The Species are;

1. GUAIAACUM; flore caruleo, fructu subrotundo. Plum. Lignum Vitæ, or Wood of Life, with a blue Flower, and roundish Fruit.

2. GUAIAACUM; flore caruleo, fimbriato, fructu tetragono. Plum. Lignum Vitæ, with a blue fringed Flower, and a four-corner'd Fruit.

These two Plants are Natives of the hottest Parts of the *West Indies*, and are with great Difficulty transplanted into *England*; for their Seeds seldom rise with us, unless they are brought very fresh, and are sown soon after

they arrive: I have some young Plants in the *Physick-Garden*, that were rais'd from Seeds *Anno* 1726, which have come on very well, tho' they are naturally Plants of a very slow Growth.

These Plants may be brought over from *America* in any of the Summer Months, which is the surest Method to obtain them, their Seeds being very difficult to grow; but great Care should be taken to transplant them into a Tub or Box of Earth at least a Month before they are put on Board the Ship, that they may be settled in the Earth, and Charge given to the Sailors not to over-water them in their Passage; which is what hath destroy'd more Plants sent from Abroad, than either the Cold, or any other Accident or Management whatever.

When the Plants arrive, they should be immediately taken out of the Tubs, preserving some Earth about their Roots, and planted into Pots fill'd with good fresh rich Earth, and plung'd into a Hot bed of Tanners-Bark, to facilitate their making fresh Roots, that they may be enabled to live through the Winter; for if they are not well rooted in the Earth before the cold Weather comes on, it will be difficult to preserve them.

In *October* they should be remov'd into a warm Stove, where the Thermometer should be kept up to twenty Degrees above Temperate, (as mark'd on Mr. *Fowler's* Thermometers); and during the Winter-season they should be often refresh'd with Water: But it should be given them very cautiously; for too much Moisture is very hurtful to these Plants. You should also carefully wash their Leaves, from Time to Time, to cleanse them from Filth, which is very subject to lodge upon the Surfaces thereof: And in Summer they should have a good Share of fresh Air, by opening the Glasses of the Stove; but they should never be wholly expos'd to the open Air, even in the hottest Season, unless for a short Time, in a gentle warm Shower of Rain, which will wash the Leaves, and greatly refresh them.

The Wood of these Trees is so hard as to break the Tools in felling them; so that it is seldom cut down for Fire-wood, being very difficult to burn.

GUAJAVA; The Guava.

The Characters are;

The Flowers, for the most part, consist of five Leaves, which are produced in a circular Order, and expand in Form of a Rose, having many Stamina or Threads surrounding the Ovary: The Ovary is of a long tubulous Figure, which becomes a fleshy Fruit, crown'd on the Top, and containing many small hard Seeds.

The Species are;

1. GUAJAVA; alba dulcis. H. L. The white Guava.

2. GUAJAVA; rubra, acida, fructu rotundiori. H. L. The red Guava.

These Trees grow to the Height of twenty Feet, or more in the *West Indies*, and have Trunks

have Trunks as thick as a Man's Thigh : But with us in *England* they are preserved in warm Stoves, and are rarely seen above six or seven Feet high, tho' there are several Trees which have produc'd Fruit in *England*.

These Plants are propagated by sowing their Seeds in a Hot-bed in the *Spring*; and when they are come up, they should each of them be transplanted into a single Halfpenny Pot fill'd with light rich Earth, and plung'd into a fresh Hot-bed, in order to bring 'em forward; observing to give 'em Air, in Proportion to the Warmth of the Weather, by raising the Glasses with Stones, &c. and in the great Heat of the Day you should shade the Glasses with Mats, to prevent their being scorch'd; and in the Summer-time they will require to be frequently water'd. As they increase in Bulk, so you must shift them into larger Pots: But you must be careful not to put them into Pots that are too large; for that will very much retard their Growth, as indeed it doth most other Plants; and towards the Beginning of *July* you must let them have a plentiful Share of Air, in order to harden 'em before Winter; for if you continue forcing 'em quite thro' the Summer, you will get 'em to be very large in one Season; but then they'll be so tender, that 'twill be difficult to preserve 'em in Winter.

At the Latter-end of *August* or Beginning of *September* you should remove the Pots into the Stove, where they should be plac'd in a moderate Situation, *i. e.* not too near the Fire, nor at too great a Distance therefrom; the Temperate Heat, as mark'd upon Mr. *Fowler's* Thermometers, agreeing better with them than a Great Degree. During the Winter-season they must be often refresh'd with Water, especially if they are plac'd upon Shelves in the Stove; but if they are plung'd into Tanners Bark, they will not require it so often; nor must they have too much given at a time; and the Water wherewith they are water'd should be plac'd in the Stove at least twenty-four Hours before it be us'd, that it may be nearly of an equal Proportion of Warmth with the Air of the House. You should also frequently wash their Leaves with a Cloth in Winter, in order to cleanse them from Dust and other Filth which may have been collected upon the Surfaces of the Leaves during their being in the House; as also from Vermin, which are very subject to infest these Plants. In the Summer you may expose them to the Air, by removing or opening the Glasses in the Front of the Stove; but they should never be suffer'd to stand Abroad, unless it be for a few Hours in a warm Rain to wash them; for when they are treated too hardily, they will never produce either Fruit or Flowers; whereas, when they are rightly manag'd, they will flower the third Season after their being sown.

These Trees are planted every-where in the *Caribbe* Islands for their Usefulness; tho' the usual Manner of their Cultivation is by being eaten: The Seeds passing intire through the Body, are voided in the Excrements; so that where-ever the *Negroes* dung, there will never

want a Supply of these Trees, which is often so great, as to become troublesome in their Plantations and Savanna's.

The Fruit (says Sir *Hans Sloane*) is accounted extremely pleasant, delicious and wholesome, and may very deservedly take the first Place among the *West-Indian* Fruits, if eaten when thoroughly ripe. They have (continues he) only this Inconvenience, that being very astringent, they stop up the Belly, if eaten in great Quantities; and the Seeds sometimes sticking to the hard Excrement, in coming through the Intestines, especially the *Rectum*, by their irregular sharp Angles, will occasion very great Pain there, and very often bring a Flux of Blood.

GUIDONIA.

The Characters are;

The Cup of the Flower consists of five Leaves, which are stiff, and of a thick succulent Make, expanding in form of a Star; these are of an Ash Colour on the Outside, and of a fine Purple on the Inside: In the Centre of the Cup arises the Flower, which consists of several Leaves, and expands in form of a Star: From the Bottom of the Flower arises the Pointal, which becomes a roundish Fruit, divided into three or four Cells, in which are contain'd many oblong Seeds.

We have but one Species of this Plant in the *English* Gardens; which is,

GUIDONIA; *Ulm*i foliis, flore roseo. *Plum.* *Guidonia* with Elm Leaves, and a Rose-colour'd Flower.

The Characters of this Plant do not very well agree with those which *Pere Plumier* hath given to this Genus of Plants. However, as the modern Botanists have agreed that this Plant here named is the same which is figur'd by *Commelin* in the *Hortus Amstelodamensis*, with the Title of *Arbustula Ulmi facie Aethiopica, ramulis alatis, floribus purpurascens*; so I have continu'd *Plumier's* Name to it: Tho' I am in doubt whether our Plant is really the same with *Plumier's*; but it is undoubtedly that which *Commelin* has figur'd and described.

This Plant may be propagated by laying down the Branches in the *Spring*, which by the succeeding *Spring* will be rooted sufficiently to transplant; and they should be taken up at the Latter-end of *March*, before the Plant shoots, and put into Pots fill'd with good rich Earth; and if you set the Pots upon a moderate Hot-bed to forward their Rooting, it will be a sure Method: Tho' they should not be too much forced; nor should they continue longer than to the End of *April* under Shelter, when they may be set abroad in some Place which is pretty well defended from strong Winds, where they may remain until *October*, at which Time they should be remov'd into the Green-house, with *Oranges*, *Myrtles*, *Oleanders*, &c. placing them in the coolest Part of the House; for they are pretty hardy, requiring nothing more than to be protected from severe Frost: and during the Winter-season they should have but little Water; for they cast their Leaves

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in Autumn; and so being destitute of them until *April*, they are incapable of discharging much Moisture: But in Summer they will require frequently to be water'd, without which, they seldom produce Flowers.

These may, with Care, be train'd up to the Height of eight or ten Feet, with regular Stems, and their Heads may also be reduc'd into a handsome Shape; but they should not be clipp'd with Shears, for that will cause 'em to appear unsightly, as also prevent their flowering; but rather shorten all strong irregular Shoots with your Knife, observing to cut behind a Leaf-bud, otherwise the Stump left beyond the Eye will appear to Sight. The best Season for this Operation is at the Latter-end of *March*, at which Time you should cut out all decay'd Branches, and shift the Plants into fresh Earth.

They may also be propagated by planting some strong Cuttings into Pots of fresh Earth in *March*, and plunge them into a moderate Hot-bed, observing to water them, and shade the Glasses in the Heat of the Day, as also to give them a good Quantity of Air when the Weather is warm, and in about a Month or six Weeks Time they will have taken Root, when you must harden them by Degrees to the open Air, to which they must be expos'd in Summer, and manag'd as was directed for the Layers.

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HÆMANTHUS, [*Αἷμα* , of *Æma* Blood, and *ἄνθος* a Flower.] i. e. Bloodflower.

The Characters are;

It has two Leaves springing from the Bulb on each Side, and bowing backwards: The Stem is single, fungous, thick, and speckled, bearing a single Flower on the Top, as it is thought: The Flower appears naked, hexapetalous (i. e. consisting of six Petals), or heptapetalous (i. e. consisting of seven Petals); but upon a close Examination, the Flower appears to be sterculous, having a Calyx consisting of six Leaves, after the manner of a Tulip, of a red Colour, among (or within) which are monopetalous Flowers, that are hexapetaloides, consisting of six long, fine, deeply-cut Segments, tubulous at the Bottom, having six Stamina, proceeding from a triangular Ovary, and tricapsular; i. e. consisting of three Capsulæ or Partitions, in which are contain'd oblong Seeds to the Number of thirty in one Calyx: The Bulb is squamose, and often, as it were, bifoliated.

We have but one Species of this Plant in England; which is,

HÆMANTHUS, *Africanus*. *H. L.* Blood-Flower, or African Tulip.

This Plant was originally brought from the Cape of good Hope, and hath been many Years preserv'd in the curious Gardens in Holland, where they now have more Sorts than one;

but in *England* it is still very rare, and in but few Gardens. The Season for transplanting the Bulbs is in *May* or *June*, when the Leaves are decay'd, at which Time they may be kept out of the Earth two or three Months without Damage; tho' the sooner they are transplanted, the stronger the Roots will be, and more likely to flower. The Soil in which they must be planted should be one half fresh Earth from a Pasture, and a fourth-part rotten Dung, and the other part Sea-Sand; these should be well mix'd, two or three Months before us'd, that their Parts may be better incorporated. Then you should put a few Stones in the Bottom of each Pot, that the Water may be the easier drain'd off; and afterwards put the Earth into the Pots, planting the Bulbs therein, only so deep as that their Upper Parts may be just cover'd: Then place the Pots in a shady Situation, giving them now and then a little Water in very dry Weather: But you must observe, never to let them have too much Moisture, especially at the Time when they are destitute of Leaves. In this Situation they may continue until the Beginning of *August*, when they must be remov'd to a warmer Place; for about that Season they will begin to push out new Roots; but they may remain abroad until the Middle or Latter-end of *September*, at which Time they should be remov'd into a moderate Stove, where they must be carefully preserv'd, observing frequently to refresh them with Water; for now their Leaves will appear, and in a short Time will grow to a large Size, if the Roots are strong: But you must not give them too much Water at once, which will endanger their rotting. The Stove in which these Plants are plac'd should be kept to near the temperate Heat as is mark'd on Mr. Fowler's Thermometers, in which they will thrive very well, and, if the Bulbs are strong, will produce their beautiful Flowers in Winter, which renders them very valuable, it being a Time when few other Flowers appear. These Roots should not be transplanted oftener than every other Year; but the Earth in the Upper-part of the Pots should be taken out twice a Year, and some fresh Earth put in, which will greatly strengthen the Roots.

HALICACABUM; vide *Alkekengi*.

HALICACABUS PEREGRINA; vide *Corindum*.

HALIMUS; vide *Atriplex*.

HARMALA: Wild Syrian Rue.

The Characters are;

The Leaves are produc'd alternately on the Branches: The Flower consists of five Leaves, which expand in Form of a Rose: The Ovary arises from the Bottom of the Calyx, and becomes a roundish Fruit, divided into three Cells.

There is but one Species of this Plant at present known; which is,

HARMALA; *Dod.* Harmel, or Wild Rue.

This Plant is propagated by sowing the Seeds in the Spring, either upon a moderate Hot-bed,

Hot-bed, or on a Border of light Earth; and when the Plants come up, they should be transplanted into a Border of good light Earth at the Distance of six Inches from each other, where they may remain until the succeeding Spring, when they may be remov'd to the Places where they are to continue. The second Summer after sowing they generally produce Flowers, and, if the Autumn proves favourable, will perfect their Seeds.

This Plant is mention'd, in the Catalogue of *Simples* annex'd to the *College Dispensatory*, as a Medicinal Plant, but it is rarely us'd in England: Nor is it a Plant of any great Beauty; so that it is rarely preserv'd in Gardens, but for the sake of Variety.

HAUTHORN; *vide* Mespilus.

HAZEL; *vide* Corylus.

HEDERA; The Ivy Tree.

The Characters are;

It is a parasitick Plant, sending forth Roots or Fibres from its Branches, by which it is fastened to either Trees, Walls, or Pales which are near it, and from thence receives a great Share of its Nourishment; the Leaves are angular; the Flowers (for the most part) consist of six Leaves, and are succeeded by round black Berries, which grow in round Bunches, each of which, for the most part, contains four Seeds.

The Species are;

1. HEDERA; *arborea*. C. B. Common Ivy.
2. HEDERA; *arborea, foliis cymis flavescentibus*. Common Ivy, with the Leaves upon the upper Part of the Shoots of a pale yellow Colour.
3. HEDERA; *communis minor, foliis ex albo, & viridi variis*. Boerb. Ind. alt. The Silver-strip'd Ivy.
4. HEDERA; *communis minor, foliis ex luteo variegatis*. The yellow variegated Ivy.
5. HEDERA; *monophyllos, convolvuli foliis*, Virginiana. Pluk. Phyt. Virginian Ivy, with a convolvulous Leaf.
6. HEDERA; *monophyllos, Virginiana, folio rotundiore umbilicato*. Round-leav'd Virginian Ivy.

The first of these Plants is very common in most Parts of England, growing sometimes very large, and forming a sort of Tree, and at other Times fastening itself to whatever Tree, Wall or Pale it stands near, where it appears like a trailing Plant, which has occasioned most Botanick Writers to mention them as two distinct Plants, whereas in reality they are the same, their Difference being occasioned by their different Situations, as may be often observed, when the upper Branches of these trailing Plants get above the Trees or Walls to which they are fastened, then they grow more woody, and form large Heads, producing Fruit, whereas that Part which is below never makes any Effort to produce either Flowers or Fruit.

These Plants are easily propagated by their trailing Branches, which send forth Roots at every Joint, which Shoots being cut off and

planted, will grow in almost any Soil or Situation, and may be trained up to Stems, or suffered to remain Climbers, to cover Walls, Pales, &c.

They may also be propagated by Seeds, which should be sown soon after they are ripe; but they very often remain two Years in the Ground before they appear, which being a tedious Method, most People make use of the former, which is very expeditious and certain.

The second Sort is a Variety of the first, from which it differs in having the Leaves upon the upper Part of the Branches, of a pale yellow Colour. This is propagated in the same Manner as the former, and may be preserved for the sake of Variety.

The third and fourth Sorts are very beautiful Plants, and are often planted against Walls or Buildings, where they adhere to the Bricks, and grow so close as to hide them from the Sight: These may also be train'd up to regular Stems and Heads, and are increas'd as the former Sorts.

The fifth and sixth Sorts are Plants very different from any of the former, nor, indeed, are they properly of the same Genus; but as they have been ranged under the same Title by some of the modern Botanists, so I thought it proper to continue them under the same, rather than place them under a quite different Title, which hath been given by the Academy of Science to this Plant.

These are propagated by laying down their tender Shoots, which will strike Roots in a Year's Time, or by Suckers taken from the Roots of the old Plants, which they are very subject to produce in Plenty. They require a warm Situation and dry Soil; but will endure the severest of our Winters without Shelter.

HEDERA TERRESTRIS; *vide* Chamæcissus.

HEDGES. Tho' Hedges are most commonly made of Quick, yet it will be proper before planting, to consider the Nature of the Land, and what Sort of Plants will thrive best in that Soil, whether it be Clay, Gravel, Sand, &c. and likewise what the Soil is from whence the Plants are to be taken; for if the Land they are taken from is better than that in which they are to be planted, it will be more difficult to get them to grow: As for the Size, the Sets ought to be about the Bigness of one's Thumb, and cut within about four or five Inches of the Ground; they ought to be fresh gather'd, strait, smooth, and well-rooted.

2dly, If the Hedge has a Ditch, it should be made three Feet wide at Top, and one at Bottom, and two Feet deep, that each may have a Slope; but if the Ditch be four Feet wide, it ought to be two Feet and an Half deep, and if it be five Feet wide, it should be three Feet, and so in Proportion.

3dly, If the Bank be without a Ditch, the Sets should be set in two Rows, almost perpendicular, at the Distance of a Foot from each other.

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athly,

4thly, The Turf is to be laid with the Grass Side downwards, on that Side of the Ditch the Bank is designed to be made, and some of the best Mould should be laid upon it to bed the Quick: then the Quick is to be laid upon it, a Foot asunder, so that the End of it may be inclining upwards, and at equal Distances of thirty Feet, plant a young Oak, Ash, Crab or Elm, to grow with the Quick.

5thly, When the first Row of Quick is laid, it must be covered with Mould, and the Turf laid upon it as before, and some Mould upon that; so that when the Bank is a Foot high, you may lay another Row of Sets against the Spaces of the lower Quick, and cover them as the former was done, and the Bank is to be topp'd with the Bottom of the Ditch, and a dry or dead Hedge laid to shade and defend the under Plantation.

6thly, Then there should be Stakes driven into the loose Earth, at about two Feet and a Half distance, so low as to reach the firm Ground.

Oak Stakes are accounted the best, and Black-thorn and Salix the next: Let the small Bushes be laid below, but not too thick, only a little to cover the Quick from being bit by Cattle, when it springs; and also to lay long Bushes at the Top to bind the Stakes in with, by interweaving them.

And in order to render the Hedge yet stronger, you may edder it (as it is call'd) *i. e.* bind the Top of the Stakes in with some small long Poles or Sticks on each Side, and when the Eddering is finish'd, drive the Stakes anew, because the waving of the Hedge and Eddering, are apt to loosen the Stakes.

The Quick must be kept constantly weeded, and secur'd from being crop'd by Cattle, and in February it will be proper to cut it within an Inch of the Ground, which will cause it to strike Root afresh, and help it much in the Growth.

When a Hedge is of about Eight or Nine Years Growth, it will be proper to plash it: the best Time for this Work is either in February or October.

When a Hedge is grown old, *i. e.* of about 20 or 30 Years Growth, and there are in it old Stubs as well as new Shoots, the old Stubs should be cut sloping off within two or three Inches of the Ground, and the best and longest of the middle Size should be left to lay down, and some of the strongest, at the Height of five or six Feet, according as you design the Height of the Hedge to be, may be left to serve instead of Stakes; and fresh Stakes should be put in those Places where they are wanting; the Hedge should be thinn'd, so as to leave on the Stubs only such Shoots as are design'd to be of Use, that there may be Room left to put a Spade in between them; the Ditch also should be cleans'd, and each Side of the Slope kept as in a new Ditch; and where the Earth is wash'd from the Roots of the Quick, or is hollow, face it anew, with so much of the first Spit of Earth that is dug out of the Ditch, as there is occasion for, and lay what is dug out at the second Spit, on the

Top of the Bank; for if it be laid on the Side or Face of the Bank, it will slip into the Ditch again when Wet comes, and also take a great deal of the Bank along with it.

In planting Quicks, there are two Extreams to be avoided; the first is laying it too low and too thick, because it makes the Sap run all into the Shoots, and leaves the Plashes without Nourishment; which with the Thickness of the Hedge, kills them.

Secondly, It must not be laid too high, because this draws all the Sap into the Plashes, and so causes but small Shoots at the Bottom, and makes the Hedge so thin, that it will neither hinder the Cattle from going through, nor from cropping of it.

When the Shoot that is designed to be plashed is bent, give it a small Cut with a Bill, half through, sloping a little downwards, and then weave it about the Stakes, and trim off the small superfluous Branches, that straggle too far out on both Sides of the Hedges.

If the Stubs are very old, cut them quite down, and secure them with good dead Hedges on both Sides, till the young Shoots are got up tall enough to plash, and plant new Sets in the void Spaces.

In making a Hedge, if it be set with Crab or Apple Stocks, it will be proper to leave one standing uncut up at every ten, twelve, or twenty Feet, on both Sides the Hedge, if the Ground be your own, which being done, they may be so ordered by pruning or staking, that one may lean into one Ground, and the other into another, &c.

These Stocks should be prun'd up every Year, till they are brought out of the Reach of the Cattle, and then they may be grafted with the Red-break, Gennet-mayl, or what other Fruit you please.

If the Stocks be of Apple-kernels, they may stand ungrafted, and they will yield very good Cyder Fruit; but then such Stocks as are not grafted, will be longer before they bear; and also when you do graft, you may be certain of your Kind; but if you find a very natural Stock, which by Leaf, Shoot and Bud appears likely, you may try it, and so you may have a new fine Fruit, and if you do not like it, you may graft it when you please.

As for the rest of the Hedge, when it has shot three or four Years, you may lay it to make a Fence with, for the doing of which, take the following Directions;

1st, At every Laying to lay down some old Plashes, or if the Hedge be thin, young ones; but they must be so laid, as to point with their Ends to the Ditch Side of the Bank, the Ends being kept low on the Bank, by being so ordered, they will the better thicken the Bottom of the Hedge, and keep up the Earth of the Bank.

2dly, To heighten the Bank every Time you lay Earth on it so as to cover the Layers all but the Ends; this Earth will very much help the Quick, and by heightning the Banks, and deepning the Ditch, you will render the Fence the better.

3dly,

3dly, Not to cut the Plashes too much; but just so as they may bend down well, not to lay them too upright, as some do; but to lay them near to a Level, and by so doing, the Sap will the better break out at several Places, and not run so much to the Ends, as it will when they lie much upon the Slope.

If you have much Wood to spare, you may cut up great Part of those that grow near the Ditch; but then you ought to hang the Bank with Bushes, to prevent Cattle from cropping them the first Year; these will shoot strong, and secure the Hedge, keep up the Bank, and thicken the Bottom of the Hedge.

4thly, Take care to lay the Hedge pretty thick, and turn the Beard on the Ditch Side; but you must not let the Beard hang uncut (though it makes a good Shew at the first making) but you must cut off all the straggling Boughs within half a Foot of the Hedge on both Sides, and this will cause it to shoot strong at these Places, and make the Hedge much the thicker.

5thly, If the Bank be high, make the Hedge so low, that it may but just serve for a Fence the first Year, for it will soon grow higher; and the lower the Hedge is made, the better the Quick will grow, and also the thicker at the Bottom; but Care must be taken to preserve it from Cattle on the Field Side, for the first Year that it is made.

6thly, If you would have a good Hedge or Fence, you should fell it often, and at every Felling root out Elder, Travellers-joy (which some call Bull-bine) Briony, &c. and do not leave too many high Standards or Pollards in it, though the Elm is one of the best; also too much dead Wood is not to be left in the Bottom of the Hedges, for that will choke the Quick; but if there be a Gap, the dead Hedge should be made at a Distance.

HEDYPNOIS, [of ἡδυπνοῖς, of ἡδύ, Sweet, and πνοῖς Breath, &c.] Trailing crooked-seeded Hawk-weed.

The Characters are;

The Cup of the Flower is like a striated Column, or a Melon; the little Leaves of the Flower-Cup, when the Flower is fallen off, embrace each of them one single umbilicated Seed; but in the Middle of the little Head are other naked Seeds, which form an Head.

The Species are;

1. **HEDYPNOIS**; *annua*. Tourn. Trailing crooked-seeded Hawk-weed, or common Hedypnois.

2. **HEDYPNOIS**; *minor*, *Cretica*, *annua*. J. Cor. Annual Hedypnois from Crete.

3. **HEDYPNOIS**; *annua*, *capite maximo*. Boerb. Ind. Annual Hedypnois, with a large Head.

These Plants are seldom propagated, except in Botanical Gardens, for the sake of Variety, as being Plants of no great Beauty or Use. The first and third Species are found wild in the Southern Parts of France, in Spain and Italy; but the second Sort was brought from Crete by Monsieur Tournefort. These may all be propagated by sowing their Seeds towards the

latter End of March, or the Beginning of April, in an open Situation and a dry Soil, where they may remain to flower and seed, for they don't care to be transplanted: The Distance which these Plants should be allow'd, must not be less than a Foot; and if the Soil be good, a Foot and an half asunder will be full little enough, for they are very apt to spread to a great Distance, and their Branches trailing upon the Ground, would occasion their rotting, were they to stand too close to each other. These Plants produce their Flowers in June and July, and their Seeds are perfected in August, when they should be gather'd and preserv'd for the succeeding Year.

HEDYSARUM, [of ἡδύς sweet, and ἄρον, Gr. the Herb Arum.] French Honey-suckle.

The Characters are;

It hath papilionaceous Flowers, which are collected into an Head or Spike: The Point of the Flower, which rises out of the Embracement, becomes a jointed undulated Pod; in each of which Joints is lodg'd a Kidney-shap'd Seed.

The Species are;

1. **HEDYSARUM**; *clypeatum*, *flore suavis* *rubente*. II. Eyst. French Honey-suckle, with a delicate red Flower.

2. **HEDYSARUM**; *clypeatum*, *flore albido*. Tourn. French Honey-suckle, with a whitish Flower.

3. **HEDYSARUM**; *clypeatum*, *minus*, *flore purpureo*. Raii Hist. Smaller French Honey-suckle, with a purple Flower.

4. **HEDYSARUM**; *trihyllum*, *Canadense*. Cornut. Three-leav'd Canada French Honey-suckle.

There are several other Species of this Plant, which are preserv'd in some curious Gardens Abroad; but these here mention'd are the chief of what I have observ'd in the English Gardens. The two first Species are very common in England, being propagated by the Gardeners near London, who supply the Markets with Plants and Flowers in the Spring of the Year.

They are all propagated by sowing their Seeds in April, in a Bed of light fresh Earth; and when the Plants come up, they should be transplanted into other Beds of the like Earth, and in an open Situation, to about six or eight Inches Distance from each other, leaving a Path between every four Rows, to go between them to hoe, and clear them from Weeds: In these Beds they may remain until Michaelmas; at which Time they may be transplanted into the large Borders of a Parterre or Pleasure-Garden, allowing them, at least, two Feet Distance from other Plants, amongst which they should be interspers'd, to continue the Succession of Flowers, where they will make a very fine Appearance when blown, especially the red Sort, which produces very handsome Flowers.

These are tolerably hardy, and are seldom hurt but by extreme Cold or great Rains; Moisture, especially in the Winter Season, is very apt to rot their Roots, therefore they should be planted in a dry Soil and in a warm Situation; and in the Spring they may be remov'd

mov'd to the Borders, where if they are much expos'd, or the Soil moist, they should not be transplanted till *March*, just before they begin to shoot out their Flower-stems; but then they will not produce their Flowers so strong as those which are planted in *Autumn*.

In order to have a Succession of these Plants, their Seeds should be sown every *Spring*, for the old Roots seldom continue long after they have flower'd; and when they do remain, their Flowers are seldom so strong as from young Roots. Their Season of flowering is in *June* and *July*, and their Seeds are perfected in *August*.

The third Sort is preserv'd in some Gardens for Variety, but the Flowers are not near so fair as those of the two former: This requires the same Management as is directed for them.

The fourth Sort hath a perennial Root, which will abide many Years, if planted in a dry Soil. This is propagated by sowing the Seeds in the manner directed for the former; but when the Plants are come up two Inches high, they should be transplanted where they are to remain for good; for if they are not too thick in the Seed-bed, they may be suffer'd to remain there until the *March* following; at which time they should be carefully taken up and transplanted into the Borders where they are design'd to stand, for their Roots generally run down very deep, so that 'tis not safe to remove them often. This Plant produces its Flowers about the same Time of the Year as the former, and perfects its Seeds in *Autumn*, and the Roots will abide in the open Air very well, resisting the severest Cold, provided they are planted in a dry Soil.

HELIANTHEMUM; [*ἥλιος* *ἡμερος*, of the Sun, and *ἄνθος*, Gr. a Flower.] Dwarf Cistus, or little Sun-Flower.

The Characters are;

The Flower-cup consists of three Leaves; the Flower, for the most part, consists of five Leaves, which are plac'd orbicularly, and expand in form of a Rose; the Pointal of the Flower becomes a globular Fruit, which divides into three Parts, having three Cells, which are fill'd with roundish Seeds fix'd to small Capillaments.

The Species are;

1. **HELIANTHEMUM**; *vulgare, flore luteo*. *J. B.* Common Dwarf Cistus, with a yellow Flower.
2. **HELIANTHEMUM**; *vulgare, flore dilutior*. *Tourn.* Common Dwarf Cistus, with a fainter Flower.
3. **HELIANTHEMUM**; *Alpinum, folio pilosella minoris Fuchsii*. *J. B.* Hoary Dwarf Mountain Cistus, with Cats-foot Leaves.
4. **HELIANTHEMUM**; *Montanum, polii folio*. *Pluk.* Mountain Dwarf Cistus, with Poley-mountain Leaves.
5. **HELIANTHEMUM**; *foliis majoribus, flore albo*. *J. B.* Great-leav'd Dwarf Cistus, with a white Flower.
6. **HELIANTHEMUM**; *album, Germanicum*. *Tab. Icon.* White German Dwarf Cistus.
7. **HELIANTHEMUM**; *flore albo, folio angusto hirsuto*. *J. B.* White-flower'd Dwarf Cistus, with narrow hairy Leaves.

8. **HELIANTHEMUM**; *saxatile, foliis & caulibus incanis, oblongis, floribus albis, Appennini montis*. *Mentz.* Rock Dwarf Cistus of the Appennines, with hoary oblong Leaves and Stalks, and white Flowers.

9. **HELIANTHEMUM**; *five Cistus humilis, folio Sampfuchii, capitulis valde hirsutis*. *J. B.* Dwarf Cistus, with a Marjoram Leaf, and very hairy Heads.

10. **HELIANTHEMUM**; *folio Thymi, floribus umbellatis*. *Tourn.* Dwarf Cistus, with a Thyme Leaf, with Flowers growing in an Umbel.

11. **HELIANTHEMUM**; *polii folio ampliore, Lusitanicum*. *Tourn.* Portugal Dwarf Cistus, with large Poley-mountain Leaves.

12. **HELIANTHEMUM**; *Germanicum, luteum, Cisti folio*. *Boerb.* German Dwarf Cistus, with a yellow Flower and Cistus Leaf.

13. **HELIANTHEMUM**; *salicis, folio*. *Tourn.* Dwarf Cistus, with a Willow Leaf.

14. **HELIANTHEMUM**; *Ledi folio*. *Tourn.* Dwarf Cistus, with a Ledum Leaf.

15. **HELIANTHEMUM**; *flore maculoso*. *Col.* Dwarf Cistus, with spotted Flowers.

There are many other Species of this Plant, which are found in the warm Parts of *Europe*, as *Portugal*, *Spain*, *Italy*, and the South Parts of *France*, but these here mention'd are all the Varieties which I have observ'd in the *English* Gardens.

The four first Sorts are found wild in several Parts of *Great Britain*; but the first is the most common of them all, and is found upon the Sides of dry Banks and chalky Hills in divers Places in *England*. The twelve first Species are perennial Plants, which grow woody, but of low Stature, seldom rising above a Foot high, the Branches, for the most part, trailing upon the Ground. These Plants are very ornamental to a Garden, especially if planted in a warm Position and a dry Soil, where they will thrive and flower exceedingly, and are very proper to plant in sloping Borders or little Declivities, where few other Plants will thrive to Advantage; and altho' the Flowers of these Plants are of no great Beauty, yet the vast Quantities which are produc'd all over the Plants, for two Months together, render them worthy of a Place in every good Garden.

These are all propagated by Seeds, (which the Plants annually furnish in great Plenty) and should be sown in a warm Border of light fresh Earth in *March* or the Beginning of *April*; and when the Plants are come up, they may be transplanted into Beds of the like Earth about four Inches asunder, or somewhat more: In which Place they may remain until *September*, when they should be remov'd to the Places where they are to continue for good, observing to take them up with a good Ball of Earth to their Roots, otherwise they are subject to miscarry.

They may also be propagated by planting Cuttings of any of the Sorts in *May*, in a Bed of light fresh Earth, observing to water and shade them until they have taken Root: These also may remain in the Beds until *September*, when they should be planted out, as was directed for the Seedling Plants; but as they generally

nerally produce great Quantities of Seeds every Year, so there will seldom be Occasion for propagating them any other way, because the Seedling Plants are generally better than those obtain'd from Cuttings, and it being more Trouble to propagate them by Cuttings, few People practise that Method.

The 13th, 14th, and 15th Sorts are annual Plants, and must be sown every Year, or the Seeds suffer'd to fall; which, if the Ground be clear from Weeds, will come up, and abide the Winter, and flower early in the succeeding Summer; which is the surest Method to obtain large Plants, especially of the 15th Sort, of which, if the Seeds are sown in the Spring, the Plants are apt to be very small, and produce but few Flowers, and many times the Seeds will not come up at all, so that if you sow them, it should be done soon after they are ripe: The Flowers of this last Sort are very beautiful, each Petal or Leaf having a deep purple Spot at the Bottom; and since it is a Plant which requires but very little Care, it is well worth keeping in a Garden.

HELIOTROPIUM; [*ἡλιοτρόπιον*, of *ἥλιος* the Sun, and *τρέπω*, Gr. to turn.] Turnsole.

The Characters are;

The Flower consists of one Leaf, and is shap'd like a Funnel, having its Center wrinkled and folded, and its Brim cut into ten Segments, alternately unequal: These Flowers are collected into a long reflex'd Spike, resembling a Scorpion's Tail; each Flower is succeeded by four naked gibbous Seeds.

The Species are;

1. **HELIOTROPIUM**; *majus*, *Discoloridi*. C. B. The great Turnsole of Dioscorides.

2. **HELIOTROPIUM**; *Americanum*, *ceruleum*, *foliis Hormini*. Acad. Reg. Sc. Blue American Turnsole, with Clary Leaves.

3. **HELIOTROPIUM**; *Americanum*, *ceruleum*, *foliis Hormini angustioribus*. H. L. Blue American Turnsole, with narrower Clary Leaves.

4. **HELIOTROPIUM**; *arborescens*, *folio teucris*, *flore albo in capitula densa congesta*. Boerb. Ind. Tree-like Turnsole, with a German Leaf and white Flowers growing in thick, short Heads.

5. **HELIOTROPIUM**; *Canariense*, *arborescens*, *folio scorodoniae* Hort. Amst. Canary Tree-like Turn-tresole, with a Wood-lage Leaf.

The first, second, and third Kinds are annual Plants: The first is very hardy, and is better preserv'd in a Garden, by suffering the Seeds to fall when ripe, which will come up in the succeeding Spring much better than when preserv'd and sown with Care, for it rarely happens that those which are sown in the Spring do grow; so that if it be intended to be had in a different Place from where the Plants grew the preceding Year, the Seeds ought to be sown soon after they are ripe; which should be in the Place where they are to remain, for these Plants seldom thrive well when transplanted, especially if it be not perform'd while the Plants are young.

This Plant produces its Flowers in June, and the Seeds ripen in August.

The second and third Sorts must be sown upon a Hot-bed in the Spring, and manag'd as was directed for the *Cyanus Turcicus* (to which the Reader is desir'd to turn, to save Repetition); for if they are not brought forward in the Spring, they seldom perfect their Seeds: There is no great Beauty in these two Plants, nor are they often cultivated but in Botanic Gardens for Variety sake.

The fourth and fifth Sorts grow to be large shrubby Plants: These are propagated by planting Cuttings of them in any of the Summer Months, in a Bed of light Earth, observing to shade and water them until they have taken Root; and in August they should be transplanted into Pots fill'd with light fresh Earth, which should be plac'd in a shady Situation until the Plants are rooted in the Pots; when they may be remov'd into the open Air amongst Myrtles, Jasmines, &c. where they may remain until October; at which time they should be remov'd into the Green-house, where they should be plac'd so as to have as much free Air as possible, and will require frequent Waterings.

The fifth Sort produces Flowers every Summer; but I have never yet seen any on the fourth Sort, although it is by much the larger Plant.

HELLEBORE; *vide* Helleborus.

HELLEBORINE; Bastard Hellebore.

The Characters are;

It hath a fibrous Root; the Leaves are broad and nervose, somewhat like those of the White Hellebore; the Flowers, which grow upon a short Foot-stalk, are collected into a Spike, each consisting of six dissimilar Leaves; the Ovary becomes a Fruit very like that of the Orchis.

The Species are,

1. **HELLEBORINE**; *latifolia*, *montana*. C. B. P. Common Bastard Hellebore.

2. **HELLEBORINE**; *altera atro-rubente flore*. C. B. P. Bastard Hellebore, with a blackish Flower.

3. **HELLEBORINE**; *flore albo*. Ger. White-flower'd Bastard Hellebore.

4. **HELLEBORINE**; *flore rotundo*, *sive Calceolus*. C. B. P. Ladies Slipper.

5. **HELLEBORINE**; *Virginiana*, *flore rotundo luteo*. Banister. Virginian Ladies Slipper, with a yellow Flower.

6. **HELLEBORINE**; *Canadensis*, *sive Calceolus Mariæ*. Icon. Robert. Canada Ladies Slipper.

There are several other Species of this Plant, some of which are of English Growth, but as they are Plants of no great Beauty, and are with great Difficulty cultivated in a Garden, so I shall pass them over without naming, these here mention'd being the most valuable Kinds which we are at present acquainted with.

These are all Natives of Woods and shady Places: The four first mention'd are found in the Woods of Yorkshire, Lancashire, and

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other

other Northern Countries in *England*: but the two last mentioned are Natives of *America*, from whence some of the Plants have been sent into *England*, which thrive and produce Flowers very well every Year. There is no other Method to obtain these Plants but by searching them out in their natural Places of Growth, and taking up their Roots, with a large Ball of the natural Soil to 'em, and then to transplant 'em into a shady Place in the Garden, and in a strong undung'd Soil: These are very pretty Ornaments to small Wildernesses, where, if the Ground between the Trees be planted with these, and other common Flowers which grow naturally in Woods, it will render such Places very agreeable; and as these require little other Culture than to preserve them from being over-run with Weeds, so the only Expence is in the first procuring them, which is easily effected in many Parts of *England*. The best Season for transplanting them is in *May*, soon after they appear above-ground.

HELLEBOROIDES HYEMALIS; vide Aconitum Hyemale.

HELLEBORO-RANUNCULUS; Globe-Ranunculus, vulgô.

The Characters are;

It hath single round circumscribed Leaves like the Ranunculus: The Cup of the Flower consists of five small Leaves of the same Colour with the Flower. The Flower consists of many Leaves growing in Form of a Ranunculus, having many Stamina in the Centre: The Fruit consists of many small Cells, which are collected into a Head, each containing many Seeds.

We have but one Species of this Plant; which is,

HELLEBORO-RANUNCULUS; flore luteo globofo. Boerb. Ind. The Globe-Flower, or Lockergowlons.

This Plant is found wild in the North Parts of *England* and *Wales* in great Plenty. It is propagated by parting the Roots in Autumn, which should be planted in a moist shady Situation, where they will thrive and flower exceedingly, and require very little Care, except to keep them clear from Weeds, and parting the Roots every other Year; for if they are permitted to continue too long unremov'd, the Flowers will not be so large, nor in so great Quantity.

HELLEBORUS, [Emic.⊙] Black Hellebore, or Christmas Flower.

The Characters are;

It hath a digitated Leaf: The Flower consists of several Leaves, which are placed orbicularly, and expand in Form of a Rose: In the Centre of the Flower rises the Pointal, which is incircumscribed about the Base with several little Horns lying between the Chives and Petals, which afterwards turn to a Fruit, in which the membranaceous Husks are gather'd, as it were, into a little Head, ending for the most part in a Horn, opening lengthwise, and for the most part full of roundish or oval Seeds.

The Species are;

1. HELLEBORUS; niger, fetidus. C. B. P. Stinking Black Hellebore, Bear's foot, or Setterwort.

2. HELLEBORUS; niger, hortensis, flore viridi. C. B. P. Green-flower'd Black Hellebore, or Bear's-foot.

3. HELLEBORUS; niger, flore albo, etiam interdum valde rubente. J. E. True Black Hellebore, or Christmas Rose.

4. HELLEBORUS; niger, trifolius. Hort. Farn. Trifoliated Black Hellebore.

5. HELLEBORUS; niger, flore roseo, minor, Belgicus. H. R. Bläs. Small Belgick Black Hellebore.

The two first Species are found wild in the Woods in divers Parts of *England*; but the 3d, 4th, and 5th Sorts are brought from other Countries, which do thrive as well with us in the open Air, as those that are Natives. The two first Sorts being Wood Plants, do thrive much better, when planted in shady moist Places, than when they are planted in a warmer Situation, and too much expos'd to the Sun. And as they produce their Flowers in the middle of Winter, when few other Plants appear; so they deserve a Place in small Wilderness Quarters, Avenues, and shady Borders, where they will flourish exceedingly, and, if suffer'd to shed their Seeds, will soon furnish a Garden with Plants enough; and this is the easiest and best Method to propagate them.

The other Sorts are propagated either from Seeds, or by planting of their Roots: The best Season for this Work is in *February*, when you may divide the Roots into small Heads, and plant them in a Situation where they may have the Morning Sun only till 10 o'Clock; for if they are too much expos'd to the great Heats of the Sun, they will not thrive. These should also have a moist light Soil; but the Ground should not have Dung in it, which is very subject to rot the Roots of these Plants.

If you propagate them by Seeds, they should be sown soon after they are ripe, which is commonly in *May*, in a Border expos'd to the Morning Sun, where the Plants will come up the *Spring* following, and should be kept clear from Weeds, which, if suffer'd to grow, would soon destroy the young Plants: In this Border they should remain until the *February* following, at which Time they should be transplanted into another Border to the Distance of six Inches square, observing to keep them constantly clear from Weeds; and in one Year after planting out, they will flower, and may then be remov'd to the Places where they are to remain for good.

There are great Doubts whether any of these Species be the true Hellebore of the Antients; tho' Mons. Tournefort and some other Travellers affirm, that the third Species is it: but yet the Germans use the *Adonis*, *Hellebori radice*, *bupbthalmi flore* for the Hellebore; and many other People believe it to be a Plant different from both these: but it is hop'd that we shall shortly know who are in the right.

HELLEBORUS ALBUS; *vide* Veratrum.

HELMET-FLOWER, or MONK'S-HOOD; *vide* Aconitum.

HEMEROCALLIS; *vide* Lilium.

HEMIONITIS, [*Ἡμιονίτις*, of *Ἥμιον* a Mule, q. d. Mule-wort, because this Plant was believ'd to be as barren as a Mule.] Moon-Fern.

This is a Plant which is seldom propagated in Gardens; therefore I shall not trouble the Reader with any Account of it more than this, that whoever hath a mind to cultivate it, may see full Directions for that Purpose under the Article *Lingua Cervina*, to which this Plant is nearly ally'd, and delights in the same Situation and Culture.

HEPATICA, [*Ἡπατική*, of *ἥπαρ* the Liver, so call'd, because the Leaves of this Plant are divided into Lobes like the Liver: (but it does not at all take its Name from its Use; for it is of no Virtue against Diseases of the Liver, as many have erroneously imagin'd) and *Trifolia*, from its Similitude thereto.] Noble Liver-wort.

The Characters are;

The Root is fibrose and perennial: The Leaf consists of three Lobes growing on a Pedicle which arises from the Root: The Pedicle of the Flower is naked and single, arising from the Root: The Cup of the Flower is, for the most part, compos'd of one Leaf, which is sometimes cut into three or four deep Divisions: The Flower consists of many Leaves, which expand in Form of a Rose: The Fruit is globular, consisting of one single Cell, which is curvated, as in the lesser *Celandine*.

The Species are;

1. HEPATICA; *trifolia, caeruleo flore.* Clus. The single blue *Hepatica*, or Noble Liver-wort.

2. HEPATICA; *trifolia, flore caeruleo pleno.* Clus. The double blue *Hepatica*, or Noble Liver-wort.

3. HEPATICA; *trifolia, flore albo simplici.* Boerb. Ind. The single white *Hepatica*, or Noble Liver-wort.

4. HEPATICA; *trifolia, rubro flore.* Clus. Single red *Hepatica*, or Noble Liver-wort.

5. HEPATICA; *trifolia, flore rubro pleno.* Boerb. Ind. Double red, or Peach-colour'd *Hepatica*.

These Plants are some of the greatest Beauties of the Spring; their Flowers are produc'd in February and March in great Plenty, before the green Leaves appear, and make a very beautiful Figure in the Borders of the Pleasure-Garden, especially the Double Sorts, which do commonly continue a Fortnight longer in Flower than the Single Kinds, and the Flowers are much fairer. I have seen the Double White Kind often mention'd in Books, but could never see it growing; tho' I don't know but such a Flower might be obtain'd from Seeds of the Single White, or Blue Kinds. I

have sometimes known the Double Blue Sort produce some Flowers in Autumn which were inclining to White; and thereby some People have been deceiv'd, who have procur'd the Roots at that Season, and planted them in their Gardens, but the Spring following their Flowers were Blue as before: And this is a common thing when the Autumn is so mild as to cause them to flower. But whether the Double White Sort mention'd in the Books, was only this accidental Alteration in the Colour of the Flower, I can't say; tho' it seems very probable it was, since I never could hear of any Person who ever saw the Double White Sort flower in the Spring.

The Single Sorts produce Seeds every Year, whereby they are easily propagated, and also new Flowers may be that way obtain'd. The best Season for sowing of the Seeds is in the beginning of August, either in Pots or Boxes of light Earth, which should be plac'd so as to have only the Morning Sun until October, when they should be remov'd into the full Sun, to remain during the Winter-season: but in March, when the young Plants will begin to appear, they must be remov'd again to a shady Situation, and in dry Weather should be frequently water'd; and about the beginning of August they will be fit to be transplanted, at which Time you should prepare a Border, facing the East, of good fresh Loamy Earth, into which you should remove the Plants, placing them at about six Inches Distance each way, closing the Earth pretty fast to their Roots, to prevent the Worms from drawing them out of the Ground, which they are very apt to do at that Season, and in the Spring following they will begin to shew their Flowers: but it will be three Years before they flower strong, and till then you cannot judge of their Goodness; when, if you find any double Flowers, or any of a different Colour from the common Sorts, they should be taken up and transplanted into the Borders of the Flower-Garden, where they should continue at least two Years before they are taken up, or parted; for it is remarkable in this Plant, that where they are often remov'd and parted, they are very subject to die; whereas, when they are permitted to remain undisturb'd for many Years, they will thrive exceedingly, and become very large Roots.

The Double Flowers, which never produce Seeds, are propagated by parting their Roots, which should be done in March, at the time when they are in Flower: but you should be careful not to separate them into very small Heads; nor should they be parted oftener than every third or fourth Year, if you intend to have them thrive, for the Reason before given. They delight in a strong Loamy Soil, and in an Eastern Position, where they may have only the Morning Sun; tho' they will grow in almost any Aspect, and are never injur'd by Cold.

HEPATORIUM; *vide* Eupatorium.

HEPTAPHYLLUM; *vide* Pentaphyllum.

HERBA

HERBA GERARDI; *vide* Angelica sylvestris minor.

HERBALIST, HERBARIST, a Person who is skill'd in distinguishing the Kinds, Natures, or Virtues of Herbs and Plants.

HERBA PARIS. Herb-Paris, True-love, or One-berry.

The Characters are;

The Cup of the Flower consists of four Leaves, which expand in Form of a Cross: The Flower also hath four Leaves, which expand in the same manner, and is generally furnish'd with four Stamina: The Pointal of the Flower becomes a soft globular Fruit, which is divided into four Cells, and are fill'd with oblong Seeds.

We have but one Species of this Plant in England, which is

HERBA PARIS. *J. B.* Solanum, quadrifolium, bacciferum. *C. B.* Herb True-love, or One-berry.

This Plant is found wild in shady Woods in divers Parts of England, and is rarely cultivated in Gardens: Those who have a mind to propagate it, should search it out in the natural Places of its Growth in April, when it first appears above-ground, and take up the Roots with a Clod of the natural Earth to them, and transplant them into a shady Part of the Garden, where, if they are not disturb'd, they will live and flower, but they are not very apt to increase when cultivated. There is no great Beauty in this Plant, but those who delight in Variety, may give it Place in a Wilderness, where few other Things will thrive.

HERBIFEROUS, signifies bearing or bringing forth Herbs.

HERBIVOROUS, *i. e.* devouring or feeding on Herbs or Grass.

To **HERBORIZE**, to go abroad in the Fields in Quest of different or new Herbs or Plants.

HERBOSE, grassy, or full of Grass or Herbs.

HERBOSITY, Grassiness, or abundance of Grass or Herbs.

HERBULENT, grassy, full of Grass or Herbs.

HERMANNIA: [Tournesfort gives the Name *Hermannia* to this Plant in Honour of the immortal Memory of the celebrated *Hermannus*: It is call'd *Ketmia Africana* in the Amsterdam Garden; but *Ketmia* has a Calix like that of the *Malloo*, and this a bladdery, squamose Calix, by which it is easily distinguish'd.]

The Characters are;

The Cup of the Flower consists of one Leaf, which resembles a Bladder, and is cut into five Segments; the Flower consists of five Leaves, the lowermost of which are narrow, but the upper ones are broad and twisted, having a pentangular Ovary in the Center, which is surrounded by five Stamina, and is afterwards turn'd to a five-corner'd long Tube.

The Species are;

1. **HERMANNIA**; *frutescens, folio oblongo, serrato, latiori.* Boerb. Ind. Shrubby *Hermannia*, with a broader oblong serrated Leaf.

2. **HERMANNIA**; *frutescens, folio grossularia, parvo hirsuto.* Boerb. Ind. Shrubby *Hermannia*, with a small, hairy, Gooseberry Leaf.

3. **HERMANNIA**; *frutescens, folio Ivisci hirsuto, molli, caule piloso.* Boerb. Ind. Shrubby *Hermannia*, with a soft, hairy Marshmallow Leaf, and a woolly Stalk.

4. **HERMANNIA**; *frutescens, folio, oblongo, serrato.* Tourn. Shrubby *Hermannia*, with an oblong, serrated Leaf.

There are some other Species of this Plant in the Botanical Gardens in Holland, but these here mention'd are all the Sorts which I have yet seen in the English Gardens.

These Plants are all propagated by planting Cuttings of them during any of the Summer Months, in a Bed of light fresh Earth, observing to water and shade them until they are well rooted, which will be in about six Weeks after planting; then you should take them up, preserving a Ball of Earth to their Roots, and plant them into Pots fill'd with light fresh Earth, placing them in a shady Situation until they have taken fresh Root; after which they may be expos'd to the open Air, with *Myrtles*, *Geraniums*, &c. until the Middle or latter End of October, when they must be remov'd into the Green-house, observing to place them in the coolest Part of the House, and where they may have as much free Air as possible, for if they are too much drawn in the House, they will appear very faint and sickly, and seldom produce many Flowers; whereas, when they are only preserv'd from the Frost, and have a great Share of free Air, they will appear strong and healthy, and produce large Quantities of Flowers in April and May, during which Season they make a very handsome Shew in the Green-house: They must also be frequently water'd, and will require to be new potted at least twice every Year, *i. e.* in May and September, otherwise their Roots will be so matted as to prevent their Growth.

These Plants rarely produce good Seeds with us; but when they are obtain'd from Abroad, they must be sown upon a moderate Hot-bed, and when the Plants come up, they must be transplanted into small Pots, and plung'd into another very moderate Hot-bed, in order to promote their Rooting; after which they must be harden'd by degrees, to endure the open Air in Summer, and may then be treated as the old Plants.

HERMODACTYLUS; *vide* Colchicum.

HERNIARIA, [of *Hernia*, Lat. a Rupture.] Rupture-wort.

The Characters are;

The Calix is quadrifid, or, for the most part, quinquefid, and expanded in Form of a Star, having five Stamina in the Center: The Fruit (which grows in the Bottom of the Flower) becomes a membranaceous, furrow'd, round Capsule, which is divided into eight Cells, each of which contains one small pointed Seed.

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The Species are;

1. HERNIARIA; *glabra*. J. B. Smooth Rupture-wort.

2. HERNIARIA; *hirsuta*. J. B. Rough or hairy Rupture-wort.

3. HERNIARIA, *Alfines folio*. Tourn. Rupture-wort, with a Chick-weed Leaf.

4. HERNIARIA; *fruticosa, viticulis lignosis*. C. B. Shrubby Rupture-wort, with woody Branches.

These Plants are seldom cultivated but in Botanick Gardens, for the Sake of Variety: The three first are, for the most part, annual Plants, seldom continuing longer than one Year, and must be permitted to shed their Seeds, whereby they are better preserv'd than if sown with Art. The fourth Sort is an abiding Plant, which may be propagated by Cuttings; but as they are Plants of no Beauty, so they are not worth cultivating.

The first Sort is what should be us'd in the Shops, but is rarely seen in London; the Herb-women commonly bringing the Parsley Break-stone to the Markets, which is sold instead of this Plant.

HESPERIS; [Some derive the Name of this Plant from *Hesperia*, Italy, from whence the People were antiently call'd *Hesperides*; but it is pretty plain that the Name was taken from *Ἑσπερος*, because most commonly they smell most in an Evening; either of these may be admitted: It is call'd *Viola Matronalis*, because it resembles the Violet, and was at first cultivated by Women.] Dame's Violet, or Queen's Gilliflower.

The Characters are;

The Flower consists, for the most part, of four Leaves, which expand in Form of a Cross; out of the Flower-cup arises the Pointal, which becomes a long, taper, cylindrical Pod, which is divided into two Cells by an intermediate Partition, to which the imbricated Valves do adhere on both Sides, and are furnish'd with oblong cylindrical or globular Seeds.

The Species are;

1. HESPERIS; *hortensis, flore purpureo*. C. B. P. Garden Dame's Violet, with a purple Flower.

2. HESPERIS; *hortensis, flore candido*. C. B. P. Garden Dame's Violet, with a white Flower.

3. HESPERIS; *lyvestris, quodora*. C. B. P. Unsavoury wild Dame's Violet.

4. HESPERIS; *hortensis, flore variegato*. Jesscu. Garden Dame's Violet, with a variegated Flower.

5. HESPERIS; *hortensis flore purpureo pleno*. H. R. Par. Garden Dame's Violet, with a double purple Flower, commonly call'd Double Purple Rocket.

6. HESPERIS; *hortensis, flore albo pleno*. H. R. P. Garden Dame's Violet, with a double white Flower or double white Rocket.

7. Hesperis; *hortensis, flore vario pleno*. H. R. Par. Garden Dame's Violet, with a variable Flower.

8. HESPERIS; *maritima, supina, exigua*. Tourn. Low Maritime Dame's Violet, or Dwarf annual Stock; *vulg.*

9. HESPERIS; *Montana, pallida, odoratissima*. C. B. P. Pale Mountain Dame's Violet, with a very sweet Smell.

There are many other Varieties of this Plant, which are preserv'd in Botanick Gardens, to add to their Variety, but these here mention'd are the most beautiful Kinds, and best worth propagating in the Flower-Garden.

The seven first mention'd Sorts are abiding Plants, and may be propagated by parting of their Roots in August, especially those with double Flowers, which never produce Seeds; but the single Kinds are better propagated by sowing their Seeds in March, which will produce stronger Plants than those obtain'd from Off-sets: The Heads, which are divided, should be well furnish'd with Roots, otherwise they are very subject to miscarry; nor should the old Roots be separated into very small Heads, which would occasion their flowering weak the succeeding Season: The Soil in which these Plants should be planted, ought to be fresh and inclining to a sandy Loam, but should not be mix'd with Dung, which often Causes the Roots to rot; but if you bury some rotten Wood-pile Earth, or very rotten Tanners-bark, just deep enough for their Fibres to reach it, the Plants will thrive exceedingly, and produce great Quantities of very large fair Flowers, as I have several times experienc'd; but if this should be so shallow as to touch the main Roots, 'tis ten to one if they don't rot away, which is very often the Case with these Flowers when they are planted in a rich dung'd Soil. The double white Rocket is by far the most beautiful Plant of all the Kinds, the Flowers of which are as large and double as the fairest double Stock-Gilliflower: It was formerly planted in great Plenty in the Gardens near London, to supply the Markets with Flowers for Basons; for which Purpose there is not any Plant better adapted, and will continue in Beauty for a long Time: But of late Years these Plants have not succeeded so well as formerly, which may be owing to the dunging of the Soil; for it is observable, that in fresh Ground, which has not been till'd, these Plants do succeed best. The single Kinds have very little Beauty in them, when compar'd with the Double, and are therefore seldom cultivated in Gardens, but as they are much hardier than the Double, and will thrive in a shady Border, so they may be admitted for Variety. These all produce their Flowers in May, and the single Kinds do perfect their Seeds in August, which if suffer'd to shed upon the Ground, will come up very well, and save the Trouble of sowing them.

The eighth Sort is often sown for Edgings to large Borders in the Pleasure-Garden, and is commonly known by the Name of Dwarf-Annual Stock-Gilliflower. The Seeds of this Kind are commonly sown in March, which will come up in a short time, and produce Flowers in June, and the Seeds will ripen in August: But the Method to have this Plant in the greatest Perfection, is to sow the Seeds in small Patches in the Borders under warm Walls in August, which will come up soon after,

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and the Plants will get Strength enough to endure the Cold, and in the *Spring* following these will produce much larger Flowers, than those Plants which come up in the *Spring*.

The ninth Sort is a biennial Plant, seldom continuing longer than two Years; this must be propagated by sowing the Seeds in the Manner directed for the first Sorts, and the second Year the Plants will flower, which if you intend to preserve, you must cut off most of the Flower-stems, before the Flowers decay, which will occasion the Roots to put out new Heads, if they are found, whereby they may be often continued three or four Years.

HIERACIUM [of *ἱέρξ*, Gr. a Hawk, so call'd, because Hawks as well as Eagles have a strong and quick Sight, and it is reported, that if by reason of the Heat of the Air, a Film grows over the Eyes of this Bird, then the Parent drops a Drop of the Juice of it in its Eye; and that in like manner it is good to clear the human Sight] Hawk-weed.

The Characters are;

The Stalks are branched, and slender; the Leaves are produc'd alternately; the Cup of the Flower is short, firm and expanded; the Flower consists of many Leaves, which are placed in an orbicular Order, and open in form of a *Marygold*; the Seeds are slender and angular, or furrowed; to which may be added, the whole Plant bath a milky Juice.

The Species are;

1. **HIERACIUM**; *murorum, folio pilosissimo*. C. B. P. Golden Hawk-weed, with hairy Leaves.

2. **HIERACIUM**; *Pyreniacum, folio cerinthae latifolium*. Schol. Bot. Pyrenian Hawk weed, with a broad Honey-wort Leaf.

3. **HIERACIUM**; *folio dentis leonis, flore suave rubente*. C. B. P. Red flower'd Hawk-weed, with Dandelion Leaves.

4. **HIERACIUM**; *lanatum, sonchi vel erigerontis facie*. H. L. Downy Hawk-weed, with the Face of Sow-thistle or Groundsel.

5. **HIERACIUM**; *medio nigrum, Boeoticum, majus*. Par. Bat. Greater Spanish Hawk-weed, with yellow Flowers, having black Bottoms.

6. **HIERACIUM**; *medio-nigrum Boeoticum, majus flore sulphureo*. Greater Spanish Hawk-weed, with Brimstone colour'd Flowers, having black Bottoms.

7. **HIERACIUM**; *barbatum, medio-nigrum, minus*. H. L. Lesser Hawk-weed, with yellow Flowers, having black Bottoms.

8. **HIERACIUM**; *latifolium, pilosum, coccineum umbellatum Indicum*. H. L. Broad-leav'd Indian Hawk-weed, with scarlet Flowers growing in an Umbel.

There are a great Variety of these Plants, which grow wild in the different Parts of *Europe*, many of which are preserv'd in the curious Botanick Gardens, to add to their Variety of Plants; but these here-mentioned, are the most beautiful Kinds, and best worth cultivating for the Beauty of their Flowers.

The first, second and eighth Sort are abiding Plants, and may be propagated by parting their Roots either in *Spring* or *Autumn*,

and should be planted in a fresh, light Soil, and an open Situation, where they will greatly increase, especially the eighth Sort, which is very subject to creep under Ground, and send forth abundance of Heads, whereby the Season of Flowering is continued thro' most Part of the Summer; for the new Off-sets commonly produce Flowers soon after they come up. These are also propagated by Seeds, which should be sown either in the *Autumn*, soon after they are ripe, or very early in the *Spring*; for if they are sown very late, the Plants seldom come up until the *Autumn* following whereby a whole Season is lost; but as they increase so fast by Off-sets, it is hardly worth while to sow their Seeds.

The other Sorts here mentioned are annual Plants, which for the Variety of their Flowers deserve a Place in a Garden; these Plants are much stronger, and produce a greater Quantity of Flowers, when they are rais'd in the *Autumn*, than those which are sown in the *Spring*, and they are so hardy as to endure the severest Cold of our Climate in the open Air, provided they are planted or sown upon a dry Soil, for too much Wet is apt to rot them: The best Season for sowing the Seeds is in *August*, and towards the latter End of *September* the Plants will be strong enough to transplant, which should be into the Borders where they are to remain for Flowering; these will produce their Flowers in *May*, and their Seeds will be ripe in *July*, which if suffered to shed upon the Ground, will grow and save the Trouble of sowing them.

HILLS have many Uses, of which I shall only mention two or three.

1st, They serve as Skreens to keep off the cold and nipping Blasts of the northern and eastern Winds.

2dly, The long Ridges and Chains of lofty Mountains being generally found to run from East to West, serve to stop the Evagation of those Vapours towards the Poles, without which they would all run from the hot Countries, and leave them destitute of Rain.

3dly, They condense those Vapours, like Alembick Heads, into Clouds, and so by a kind of external Distillation, give Origin to Springs and Rivers; and by amassing, cooling and constipating them, turn them into Rain, and by that Means render the fervid Regions of the Torrid Zone habitable.

4thly, They serve for the Production of a great Number of Vegetables and Minerals, which are not found in other Places.

It has been found by Experiment and Calculation, that *Hills*, tho' they measure twice as much Ground as the Plain Ground they stand upon, yet the Produce of the one can be no more than the other, and therefore in purchasing Land, the *Hills* ought not to be bought for more than their superficial Measure, i. e. to pay no more for two Acres upon the Side of an Hill, than for one upon the Plain, if the Soil be equally rich.

It is true that those Lands that are Hilly and Mountainous, are very different as to their valuable

valuable Contents, from what are found in flat and plain Ground, whether they be planted, sown or built upon ; as for Example,

Suppose an *Hill* contains four equal Sides, which meet in a Point at the Top, yet the Contents of these four Sides can produce no more Grain, or bear no more Trees than the plain Ground on which the *Hill* stands, or than the Base of it ; and yet by the Measure of the Sides, there may be double the Number of Acres, Rods and Poles, which they measure on the Base or Ground-Plot.

For as long as all Plants preserve their upright Method of growing, hilly Ground can bear no more Plants in Number than the Plain at the Base.

Again, as to Buildings on an *Hill*, the true Sides of an *Hill* will bear no more than the same Number of Houses that can stand in the Line at the Base.

And as to *Rails*, or *Park-pailing* over an *Hill*, though the Measure be near double over the *Hill* to the Line at the Bottom, yet both may be inclosed by the same Number of Pales of the same Breadth.

HIPPOCASTANUM [of *ἵππος*, Gr. a Horse, and *Castanea*, Lat. a Chestnut] Horse-Chestnut.

The Characters are ;

It hath digitated or finger'd Leaves ; the Flowers, which consist of five Leaves, are of an anomalous Figure, opening as it were with two Lips ; there are Male and Female upon the same Spike, which when fully blown, make a specious Shew, being always produced at the Extremity of the Branches ; the Female Flowers are succeeded by Nuts which grow in green prickly Husks.

The Species are ;

1. **HIPPOCASTANUM** ; *vulgare*. *Tourn.* Common Horse Chestnut.

2. **HIPPOCASTANUM** ; *vulgare*, *foliis ex luteo variegatis*. The yellow blotch'd Horse Chestnut.

3. **HIPPOCASTANUM** ; *vulgare*, *foliis ex albo variegatis*. The white blotch'd Horse-Chestnut.

The first of these Trees (of which there seems to be two or three Varieties differing in the Breadth of their Leaves, and the Colour of their Flowers, one of which hath its Flowers remarkably spotted with Red and Yellow, so as to be seen at a great Distance, and is somewhat later in flowering) is very common in *England*, having been greatly cultivated for planting Avenues and shady Walks near Habitations, where, in the Spring of the Year, (which is their Season of flowering) they make a most beautiful Shew, and their Leaves being very large, afford an agreeable Shade in the Heat of Summer ; but if the Number of these Trees be too great, or too near the Habitation, they cause the circumambient Air to be moist and unhealthy, by the large Quantities of Moisture which they perspire through their Leaves, so that they should always be placed at such a Distance, as to admit of a free Current of Air to pass between them and the

Building, that the rancid Air may be carried off thereby.

This Tree is propagated by planting the Nuts early in the *Spring*, after the Manner as was directed for the common Chestnut (to which I refer the Reader, to avoid Repetition) the Spring following the Plants may be transplanted into a Nursery, in Rows at three Feet distance, and eighteen Inches asunder in the Rows, where they may continue three Years, after which Time, they may be transplanted for Avenues, &c. where they are to remain: The best Season for transplanting these Trees is at the latter End of *February*, or the Beginning of *March* ; (though indeed, they may be transplanted in *Autumn*, or during any of the Winter Months, when other deciduous Trees are removed) but the other is the surest Season, especially for moist Soils.

In transplanting of these Trees, we should never shorten any of their Branches ; but only cut off intirely all such as are ill placed, or grow irregular, for these Trees have always a large turgid Bud placed at the Extremity of their Branches, in which is inclosed the Shoot for the succeeding Spring, which Bud is of great Service in attracting the Nourishment, and promoting the future Growth of the Tree, and it is often observable, where their Branches are shortened, that there is produced a glutinous Substance, almost of the Consistence of Turpentine, which often occasions the Decay of those particular Branches, and sometimes of the whole Tree.

These Trees have something very singular in their Growth, *i. e.* that their whole Year's Shoot is commonly performed in three Weeks Time, after which it does no more than increase in Bulk, and become more firm and substantial ; and all the latter Part of the Summer is occupied in forming and strengthening the Buds for the next Year's Shoots. There is a great Regularity in the natural Growth of these Trees, their Under-branches being always greatly extended, and the succeeding ones decreasing gradually to the Top, do form a natural obtuse Pyramid, which Regularity is by many People greatly disliked, as appearing too much like those artificial Pyramids, which were formerly so much esteem'd and cultivated on ever-green Trees ; but are now very justly despised by all curious Persons: Though it must be allowed, where these Trees are rightly disposed in forming of Clumps, &c. their conical Figure has a very good Effect, by rendering such Plantations very agreeable to the Eye at some Distance, especially when the under Parts of the Trees are hid from Sight, by other Trees which surround them.

These Trees were originally brought from *Constantinople* into *Europe* ; but although they are Natives of so warm a Country, yet they are now so enur'd to the Cold, as to defy the severest of our Winters, and do grow to be very large Trees, and produce great Quantities of Nuts annually, from which they may be multiplied at Pleasure. The Fruit of this Tree is very bitter, and of no Use amongst us

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at present; but in *Turkey* they give them to Horses, in their Provender, that are troubled with Coughs, or are Short-winded, in both which Distempers they are supposed to be very good.

HIPPOLAPATHUM; *vide* Lapathum.

HIPPOSELINUM; *vide* Smyrneum.

HIRUNDARIA; *vide* Asclepias.

HOLLOW ROOT; *vide* Fumaria.

HOLLY-HOCKS; *vide* Malva rosea.

HOLLY; *vide* Aquifolium.

HOMOGENEAL or **HOMOGENEOUS** Plants, are such Plants as are of the same Kind or Nature with others.

HONEY-SUCKLE; *vide* Caprifolium.

HOPS; *vide* Lupulus.

HORDEUM. Barley.

The Characters are;

It hath a thick Spike; the Calix, Husk, Awn and Flower, are like those of Wheat or Rye, but the Awns are rough; the Seed is facelling in the Middle, and for the most part ends in a sharp Point, to which the Husks are closely united.

The Species are;

1. **HORDEUM**; *distichum*. Ger. Common long-ear'd Barley.

2. **HORDEUM**; *polystichum*, *vel* *hybernum*. Park. Winter or Square Barley, or Bear Barley; by some call'd Big.

3. **HORDEUM**; *distichum*, *spica brevior* & *latiori*, *granis confertis*. Rar. Sprat Barley or Battle-door Barley.

There are some other Varieties of Barley of less Note; but these here mention'd are preferred for Use, as being the most profitable Sorts: The first and third Sorts are commonly cultivated in *England*; but the Second is rarely to be seen near *London*, though I think it much preferable to the other two, as producing a larger Seed and very full thick Spike.

The Manner of propagating these being so well known to every Farmer, it would be needless to mention any thing of that Kind in this Place.

HORIZONTAL SHELTERS, have by some Persons been greatly recommended to preserve Fruit-Trees from Blights; but with how little Reason, or upon what slight Experiments, every one who has ever made use of them, will easily judge; especially those which are contrived by placing Tiles in the Wall at certain Distances, nothing being more obvious than that Vegetables, when prevented from receiving the Benefit of Dews, Rains, &c. those kindly Benefits of Heaven, do grow weak, languid, and at last intirely decay: And since from vast Numbers of Experiments which have been lately made, we find that Trees imbibe great Quantities of Nourishment through the Pores of their Leaves and Branches, whereby they are rendred vigorous and healthy, even in such Seasons, and upon such

Soils, where one would think it impossible they should receive much Nourishment from the Earth; so to deprive them of this Advantage, is no less than destroying them; though perhaps if the Trees are vigorous, it may not be effected suddenly, but there will be very visible Signs of Decay on them daily, and a few Years will put a Period to their Lives, as I have more than once observed, where such Walls were built.

The only Sort of these Shelters which I have ever observed useful for Fruit-Trees, was made with two Leaves of Slit Deal, join'd over each other and painted, this being fixed upon the Top of the Wall with Pullies, to draw up and down at pleasure, formed a sort of Penthouse, which being let down in great Rains, or Cold Nights, during the Time that the Trees were in flower, or the Fruit was setting, proved serviceable; but then these Shelters were removed away soon after the Fruit was set, so that the Trees might enjoy all the Advantages of Rain, Dew, &c. in the Summer; which is absolutely necessary, if we would have healthy Trees, or good Fruit.

HORMINUM [is so call'd of *ἰσχυρῶς*, Gr. to rush, or be carried with a Force, because by its Force it stimulates and violently increases the venereal Appetite] Clary.

The Characters are;

It hath a labiated Flower, consisting of one Leaf, whose upper Lip is short and crested, but the under one is divided into three Parts, the middle Division is hollowed like a Spoon; out of the Flower-cup arises the Pointal, fixed like a Nail to the hinder Part of the Flower, and attended with four Embryos which afterwards turn to so many roundish Seeds, inclosed in the Cup of the Flower.

The Species are;

1. **HORMINUM**; *sylvestre*, *lavendula flore*. C. B. P. Common English wild Clary, or *Oculus Christi*.

2. **HORMINUM**; *comâ purpureo-violaceâ*. I. B. Clary, with a Purple-violet Top.

3. **HORMINUM**; *sylvestre*, *latifolium*, *verticillatum*. C. B. P. Broad-leav'd wild Clary, with whorled Spikes.

The first of these Plants is found wild upon dry Banks, in diverse Parts of *England*, and is seldom cultivated in Gardens; the Seeds of this Kind are by some People greatly esteem'd for clearing the Eyes, of any thing that may have gotten into them, which is effected by the glutinous Quality of the Seed, which when put into the Eye, and moved about, will fasten any thing thereto which it meets with, and thereby it is taken out.

The second Sort is a beautiful annual Plant and deserves to have a Place in a good Garden, for the Oddness of its Spikes, which have fine Purple-violet colour'd Tops: But the third Sort is not very beautiful, and is chiefly cultivated in Botanick Gardens, with many other Varieties of less Note.

These may all be propagated by sowing their Seeds in the *Spring* in an open Situation, and when the Plants are come up, they should be

be either transplanted out to the Distance of a Foot square, or hoe'd out to the same Distance, observing to keep 'em clear from Weeds, which is all that is needful to be regarded in their Culture.

The first and third Sorts are abiding Plants, their Roots continuing several Years; but the second Sort will decay soon after the Seeds are perfected. If the Seeds of this Kind are permitted to shed upon the Ground when they are ripe, the Plants will come up in Autumn, abide the Winter, and flower early in the succeeding Summer, and their Flowers will be much larger than those which are sown in the Spring. For *Garden Clary*, see *Sclarea*.

HORNBEAM; *vide* *Carpinus*.

HORSE-CHESNUT; *vide* *Hippocastanum*.

HORSE-DUNG is of great Use to make Hot-beds for the raising all Sorts of Early Garden Crops, as *Cucumbers*, *Melons*, *Asparagus*, *Salleting*, &c. for which Purpose no other Sort of *Dung* will do so well, this fermenting the strongest, and, if mix'd with long Litter and Sea-coal Ashes in a due Proportion, will continue its Heat much longer than any other Sort of *Dung* whatsoever; and after wards, when rotted, becomes an excellent Manure for most Sorts of Land, more-especially for such as are of a cold Nature; and for stiff, clayey Lands, when mix'd with Sea-coal Ashes, and the Cleanings of *London Streets*, it will cause the Parts to separate much sooner than any other Compost will do; so that where it can be obtain'd in Plenty, I would always recommend the Use of it for such Lands.

HOSE IN HOSE, a Term us'd in Gardening, to signify one long Husk within another, as in the *Polyantbos*.

HOSE-HUSK, is a long round *Husk*, as in *Pinks*, *July-Flowers*, &c.

HOT-BEDS are of general Use in these Northern Parts of *Europe*, without which, we could not enjoy so many of the Products of warmer Climes as we do now; nor could we have the Tables furnish'd with the several Products of the Garden, during the Winter and Spring Months, as they are at present in most Parts of *England*. The Ordinary *Hot-beds* which are commonly us'd in the Kitchen-Gardens, are made with new Horse-dung, in the following manner.

1st, Provide a Quantity of new Dung from the Stable (in which there should be part of the Litter or Straw which is commonly us'd in the Stable) in Proportion to the Length of the *Bed* intended; which, if early in the Year, should not be less than one good Load for each Light; this Dung should be thrown up in an Heap, mixing therewith a few Sea-coal Ashes, which will be of Service to continue the Heat of the Dung; it should remain six or seven Days, by which Time it will

have acquir'd a due Heat: Then in some well-shelter'd Part of the Garden you must dig out a Trench in Length and Width proportionably to the Frames you intend it for, and, if the Ground be dry, about a Foot deep; but if wet, not above six Inches: then wheel the Dung into the Opening, observing to stir every Part of it with a Fork, and lay it exactly even and smooth thro' every Part of the *Bed*; as also to lay the Bottom-part of the Heap (which is commonly free from Litter) upon the Surface of the *Bed*; this will prevent the Steam from rising so plentifully as it would otherwise do: And if it be design'd for a *Bed* to plant out *Cucumbers* or *Melons* to remain for good, you must make a Hole in the middle of each Light about ten Inches over, and six deep, which should be fill'd with good fresh Earth, thrusting a Stick into the Middle, to shew the Place where the Hole is; then cover the *Bed* all over with the Earth which was taken out of the Trench about four Inches thick, and cover it with the Frame, letting it remain until the Earth be warm, which commonly happens in two Days after the *Bed* is made; then you may place the Plants therein, as is directed for each Kind under their proper Heads.

But if your *Hot-bed* be design'd for other Plants, there need be no other Holes made in the Dung, but after having smoothed the Surface with a Spade, you should cover the Dung about three or four Inches thick with good Earth, putting on the Frames and Glasses as before.

In the making of these *Hot-beds*, it must be carefully observ'd to settle the Dung close with a Fork; and if it be pretty full of long Litter, it should be equally trod down close in every Part, otherwise it will be subject to heat too violently; and consequently the Heat will be much sooner spent, which is one of the greatest Dangers this *Bed* may be liable to. During the first Week or ten Days after the *Bed* is made, you should cover the Glasses but slightly in the Night, and in the Day-time carefully raise them to let out the Steam, which is subject to rise very copiously while the Dung is fresh: but as the Heat abates, so the Covering should be increas'd, otherwise the Plants in the *Beds* will be stunted in their Growth, if not intirely destroy'd. In order to remedy this Evil, if the *Bed* be very cold, you must put a pretty good Quantity of new hot Dung round the Sides of it, which will add a fresh Heat thereto, and cause it to continue a considerable Time after; and as the Spring advances, so the Sun will supply the Loss of the Dung's Heat: but then it will be adviseable to lay some Mowings of Grass round the Sides of the *Bed*, especially if the Nights should prove cold, as it often happens in *May*, which is many times, even at that Season, very hurtful to tender Plants on *Hot-beds*.

But although the *Hot-bed* I have described is what the Kitchen Gardeners commonly use, yet those made with Tanner's Bark are much more preferable, especially for all

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tender Exotick Plants or Fruits, which require an even Degree of Warmth to be continu'd for several Months; which is what cannot be effected by Horfe-dung. The Manner of making these *Beds* is as follows:

You must dig a Trench in the Earth about three Feet deep, if the Ground be dry; but if wet, it must not be above a Foot deep at most, and must be rais'd two Feet above-ground. The Length must be proportion'd to the Frames intended to cover it; but that should never be less than eleven or twelve Feet, and the Width not less than six, which is but a sufficient Body to continue the Heat. This Trench should be brick'd up round the Sides to the above-mentioned Size of three Feet, and should be fill'd in the Spring with fresh Tanners Bark, (*i. e.* such as the Tanners have lately drawn out of their Vats, after they have us'd it for tanning Leather) which should be laid in a round Heap for three or four Days before it is put into the Trench, that the Moisture may the better drain out of it, which, if detain'd in too great a Quantity, will prevent its Fermentation; then put it into the Trench, and gently beat it down equally with a Dung-fork: But it must not be trodden, which would also prevent its heating, by settling too close: Then you must put on the Frame over the *Bed*, covering it with the Glasses, and in about ten Days or a Fortnight it will begin to heat, at which Time you may plunge your Pots of Plants or Seeds into it, observing not to tread down the Bark in doing of it.

A *Bed* thus prepar'd (if the Bark be new, and not ground too small) will continue in a good Temper of Warmth for six Months; and when you find the Heat decline, if you stir up the Bark again pretty deep, and mix a Load or two of fresh Bark amongst the old, it will cause it to heat again, and preserve its Warmth two or three Months longer: There are many People who lay some hot Horfe-Dung in the Bottom of the Trench under the Bark, to cause it to heat, but this is what I would never practise, unless I wanted the *Bed* sooner than the Bark would heat of its self, and then I would put but a small Quantity of Dung at Bottom, for that is subject to make it heat too violently, and will occasion its losing the Heat sooner than ordinary, and there will never be any Danger of the Bark's heating, if it be new and not put into the Trench too wet, though it may sometimes be a Fortnight or more before it acquires a sufficient Warmth, but then the Heat will be more equal and lasting.

The Frames which cover these *Beds*, should be proportion'd to the several Plants they are design'd to contain; for Example, if they are to cover the *Anana* or *Pine-Apple*, the back Part of the Frame should be three Feet high, and lower Part fifteen Inches, which will be a sufficient Declivity to carry off the Wet, and the Backside will be high enough to contain the Plants that are in Fruit, and the lower Side will be sufficient for the shortest Plants; so that by placing them regularly according to their Height, they will not only have

an equal Distance from the Glasses, but also appear much handsomer to the Sight: And although many People make their Frames deeper than what I have allotted, yet I am fully perswaded, that where there is but Height enough to contain the Plants, without bruising their Leaves, it is much better than to allow a larger Space; for the deeper the Frame is made, the less will be the Heat of the Air inclos'd therein, there being no artificial Warmth but what the Bark affords, which will not heat a large Space of Air; and as the *Pine-Apple* requires to be constantly kept very warm, in order to ripen the Fruit well, so it will be found, upon Trial, that the Depth I have allow'd will answer that Purpose better than a greater.

But if the *Bed* be intended for taller Plants, then the Frame must be made in Depth proportionable thereto: But if it be for sowing of Seeds, the Frame need not be above fourteen Inches high at the Back, and seven Inches deep in the Front, by which Means the Heat will be much greater: And this is commonly the Proportion allow'd to the Frames usually made use of in the Kitchen-Gardens. As to their Length, that is generally according to the Fancy of the Owner, but they commonly contain three Lights each, which is in the Whole about eleven Feet in Length, though sometimes they are made to contain four Lights, but this is too great a Length; the Frames thus made are not so handy to remove as when they are shorter, and are more subject to decay at their Corners. Some, indeed, have them to contain but two Lights, which is very handy for raising *Cucumber* and *Melon* Plants while young; but this is too short for a *Bark-bed*, as not allowing Room for a proper Quantity of Bark to continue a Warmth for any considerable Time, as was before mention'd; but for the other Purposes, one or two such Frames are very convenient.

As to those Frames which are made very deep, it is much the better Way to have them made to take asunder at the four Corners, so that they may be remov'd with Ease, otherwise it will be very difficult to take the Frame off when there is Occasion to put in new Bark, or take out the old. The Manner of making these Frames is generally known, or may be much better conceiv'd by seeing them than can be express'd in Writing, therefore I shall forbear saying any thing more on this Head.

HOUGHING or HOEING, is necessary and beneficial to Plants, for two Things, *First*, For destroying of Weeds: *Secondly*, Because it disposes the Ground the better to imbibe the Night Dews, and keep it in a constant Freshness, and addeth a Vigour to the Trees, whose Fruit by that means becomes better condition'd than otherwise it would be.

HUMIDITY, is the *Quality* commonly call'd *Moisture*, or the Power of wetting others, which *Quality* some Liquors and Fluids are endow'd with, and it differs very much from *Fluidity*, in that it depends altogether on the Congruity

Congruity of the component Particles of any Liquor to the Pores or Surfaces of such particular Bodies as it is capable of adhering to.

Thus *Quicksilver* is not a moist Liquor, in respect to our Hands or Cloaths, and many other Things it will not stick to; but it may be call'd a moist Liquor in respect to Gold, Lead or Tin, to the Surfaces of which it will presently adhere.

Nay, Water it self, that wets almost every thing, and is the great Standard of *Humidity* or *Moisture*, is not capable of wetting every thing, for it stands, and runs easily off in globular Drops on the Leaves of *Cabbages*, and many other Plants, and will not wet the Feathers of *Ducks*, *Swans*, and other Water-Fowl.

And it is very plain, that it is only the Texture that may cause the Fluid to be humid, because neither *Quicksilver* alone, nor *Bismuth* will stick upon Glass; yet being mix'd together, they will form a Mass that will stick on it, as is very well known in the foliating of Looking-glasses, in which such a Composition is us'd.

HYACINTHUS; [*ῥάκυνθος*, Gr.] Hyacinth or Jacinth.

The Characters are;

It hath a bulbous Root; the Leaves are long and narrow; the Stalk is upright and naked, the Flowers growing on the upper Part in a Spike; the Flowers consist each of one Leaf, are naked, tubulose, and cut into six Divisions at the Brim, which are reflex'd; the Ovary becomes a roundish Fruit with three Angles, which is divided into three Cells that are fill'd with roundish Seeds.

The Species are;

1. **HYACINTHUS**, *Anglicus*, *flore cœruleo*. Ger. Blue English Hair-bells.

2. **HYACINTHUS**, *Anglicus*, *flore albo*, Ger. White English Hair-bells.

3. **HYACINTHUS**, *Anglicus*, *flore incarnato*. Flesh-colour'd English Hair-bells.

4. **HYACINTHUS**, *Orientalis*, *brumalis*, *præcoccissimus*, *flore albo*. Boerb. Ind. The earliest White Oriental Hyacinth, commonly call'd *Januarius*.

5. **HYACINTHUS**, *Orientalis*, *brumalis*, *flore pallidæ cœruleo*. Boerb. Ind. Oriental Jacinth, with a pale blue Flower, commonly call'd *The Imperial*.

6. **HYACINTHUS**, *Orientalis*, *albus primus*. C. B. Common Oriental Jacinth, with a White Flower.

7. **HYACINTHUS**, *Orientalis*, *major*, *præcox*, *dichus Zimbul Indi*. Park. Par. The Great Oriental Jacinth, commonly call'd *Zimbul Indi*.

8. **HYACINTHUS**, *Orientalis*, *maximus*, *flore amœne cœruleo*, *polyanthus*. H. R. P. The greatest Eastern Jacinth, with many Flowers of a fine blue Colour.

9. **HYACINTHUS**, *Orientalis*, *flore pleno cœruleo*, *vel purpureo-violaceo*. Park. Par. The double blue Oriental Jacinth.

10. **HYACINTHUS**, *Orientalis*, *candidissimus*, *flore pleno*. Park. Par. The whitish double Oriental Jacinth.

11. **HYACINTHUS**, *Orientalis*, *multiplici flore pallidæ incarnatus*. H. L. Double Oriental Jacinth, with a pale Flesh-colour'd Flower, commonly call'd *The Pulchra*.

12. **HYACINTHUS**, *Orientalis*, *flore pleno, cœruleo-purpureo, clavo longo, petalis modice reflexis*. Boerb. Ind. Double blue Oriental Jacinth, with a long Style, and the Plants moderately reflex'd, commonly call'd *The Double Cardinal*.

13. **HYACINTHUS**, *Orientalis*, *flore plenifimo, albo, intus eleganter roseo, clavo conico, obtuso, petalis valde reflexis*. Boerb. Ind. The most double Oriental Jacinth, with a white Flower of an elegant Rose-colour in the Middle, and the Petals greatly reflex'd, commonly call'd *The King of Great Britain*.

14. **HYACINTHUS**, *Orientalis*, *flore plenifimo, candidissimo toto & intus, clavo conico, obtuso, petalis valde reflexis*. Boerb. Ind. The most double Oriental Jacinth, with a pure white Flower, and the Petals greatly reflex'd, commonly call'd *The Queen of Great Britain*.

15. **HYACINTHUS**, *Orientalis*, *flore pleno, lacteo, lituris carneis, clavis longis*. Boerb. Ind. Double Oriental Jacinth, with a Milk-colour'd Flower streak'd with a pale Red, commonly call'd *Claudius Albinus*.

16. **HYACINTHUS**, *Orientalis*, *flore plenifimo carneo, lituris roseis, clavo conico longissimo, intus roseo, petalis valde reflexis*. Boerb. Ind. The most double Oriental Jacinth, with a Flesh-colour'd Flower streak'd with a Rose-colour, and the Petals greatly reflex'd, commonly call'd *Apollo*.

17. **HYACINTHUS**, *Orientalis*, *flore pleno squallide candido, clavo ad basin utriculato, longo, petalis valde reflexis*. Boerb. Ind. Double Oriental Jacinth, with a dirty white Flower and reflex'd Petals, commonly call'd *Agaath Mignon*.

18. **HYACINTHUS**, *Orientalis*, *flore plenifimo, albo, paucillo carnei admisso, clavo longo anguloso, plano, ore amplissimo*. Boerb. Ind. Double Oriental Jacinth, with a Flower intermix'd with very little Flesh-colour'd Spots, commonly call'd *Claudius Civilis*.

19. **HYACINTHUS**, *Orientalis*, *flore plenifimo, carneo & corallino rubro, clavo crasso, brevi, petalis maxime reflexis*. Boerb. Ind. Oriental Jacinth, with a very double, red Coral-colour'd Flower, and the Petals greatly reflex'd, commonly call'd *Coralline*.

20. **HYACINTHUS**, *Orientalis*, *flore plenifimo, candidissimo, in fundo oris roseo*. Boerb. Ind. Oriental Jacinth, with a very double pure white Flower, and the Bottom of the Rim of a Rose-colour, commonly call'd *The Queen of Flowers*.

21. **HYACINTHUS**, *Orientalis*, *flore plenifimo candidissimo, petalis angustis & magis acutis*. Oriental Jacinth, with a very double pure white Flower, with narrow sharp-pointed Petals, commonly call'd *The King of Flowers*.

22. **HYACINTHUS**, *Orientalis*, *flore plenifimo, candidissimo, toto, clavo conico, petalis maxime reflexis, caule & flore maximis*. Boerb. Ind. Oriental Jacinth, with a very double white Flower, and the Petals very much reflex'd,

flex'd, and large Stalks and Flowers, commonly call'd Kaifar's White Jewel.

23. *HYACINTHUS, Orientalis, flore plenissimo, candido carneo lituris rubellis, clavo brevissimo, crassissimo.* Boerb. Ind. Oriental *Hyacinth*, with double white Flowers streak'd with Red, commonly call'd The Princess Royal.

Besides these here mention'd, there are a great Variety of fine double *Hyacinths*, with beautiful variegated Flowers, most of which have Names impos'd on them according to the Fancy of their Owners, and some of these are highly esteem'd by the Florists in *Holland*, where, according to their printed Catalogues, they have many Flowers which are valu'd at five, six, seven, eight, or ten Pounds, per Root: But as these are Varieties which have been obtain'd from Seeds, so the Number of them are continually increas'd where People do constantly sow of their Seeds; and those new Flowers which are rais'd, if they are large, beautiful, and very double, will always be much valu'd at first, until there has been a good Number of Roots obtain'd from them; after which they constantly decrease in their Value according to their Plenty: But to enumerate all the Sorts that are now printed in the *Dutch Catalogues*, would be to no Purpose in this Place, therefore I shall only mention some of the starry *Hyacinths*, and afterwards proceed to their Culture.

1. *HYACINTHUS, stellaris, bifolius, Germanicus. C. B. P. flore carulco.* Early blue starry *Hyacinth*; vulgò.

2. *HYACINTHUS, stellaris, bifolius, Germanicus, flore exalbido.* Boerb. Ind. Early white starry *Hyacinth*; vulgò.

3. *HYACINTHUS, stellaris, Byzantinus.* Claf. Great starry *Hyacinth*; vulgò.

4. *HYACINTHUS, stellaris, caruleus amœnus. C. B. P. Fine blue starry Hyacinth.*

5. *HYACINTHUS, stellatus, Peruanus. H. Eyt.* Blue starry *Hyacinth* of Peru.

6. *HYACINTHUS, stellatus, Peruanus, flore albo.* White starry *Hyacinth* of Peru.

The first of these *Species* is a Native of *England*, growing in Woods, and under Hedges in divers Parts, but especially near *London*. The two next mention'd are Varieties which have been accidentally obtain'd from the first, from which they differ only in the Colour of their Flowers. The twenty next mention'd are all of them Varieties of the Oriental *Hyacinths*, which were originally brought from *Asia*; but by the Industry of the Florists in *Holland* and *Flanders*, they have been so much improv'd as to become one of the most ornamental Flowers of the *Spring*: And as they continue sowing Seeds annually of these Flowers, so they not only increase the Numbers of their Flowers, but have yearly some extraordinary Beauties appear, which are, according to their Stature, Beauty, and other Properties, highly esteem'd, and are sometimes bought at a very great Expence by the curious Delighters in these Beauties.

The first and second Sorts of the starry *Hyacinths* are found in some Parts of *Germany*: The first is also a Native of *England*; the se-

cond being only a Variety of the first, which probably was obtain'd from Seeds: The third and fourth Sorts were brought from *Constantinople*; and the fifth and sixth Sorts, tho' by their Names suppos'd to be brought from *Peru*, yet are they found in many Places in the *Lerant*, and Monsieur *Tournefort* mentions them as Natives of *Portugal*; but my ingenious Friend Mr. *Henry Hopkcy* sent me some Seeds of them which he gather'd upon *Gibraltar Hills*, where he found them growing in great Plenty. The two first mention'd do flower in *February*, which causes them to be greatly esteem'd. The third and fourth Sorts produce their Flowers in *April*; but the fifth and sixth do not flower until the Middle of *May*, so that they keep a regular Succession from the Middle of *February* until the End of *May*; and if their Roots are permitted to remain three Years undisturb'd, they will produce many Stems of Flowers from each Tuft, whereby they will make a very beautiful Appearance, and continue the Succession much better than when they are transplanted every Year, and their Flowers will be much stronger.

All the different Sorts of *Hyacinths* are propagated by Seeds or Off-sets from the old Bulbs; the former Method has been but little practis'd in *England* till very lately, but in *Holland* and *Flanders* it hath been continually follow'd for many Years, whereby they have obtain'd a very great Variety of the most beautiful Flowers of this kind; and it is owing to the Industry of the Florists in those Countries, that the Lovers and Delighters in Gardening are so agreeable entertain'd, not only with the curious Variety of this, but of most other bulbous-rooted Flowers, few other Florists thinking it worth their Trouble to wait four or five Years for the Flowers of a Plant which when produc'd, perhaps, there might not be one in forty that may deserve to be preserv'd; but they did not consider that it was only the Loss of the three or four first Years after sowing, for if they continu'd sowing every Year after they began, there would be a Succession of Flowers annually, which would constantly produce some Sorts that might be different from what they had before seen; and new Flowers being always the most valuable by skilful Florists, (provided they have good Properties to recommend them) it would always be a sufficient Recompence for their Trouble and Loss of Time.

The Method of raising these Flowers from Seed, is as follows: Having provided yourself with some good Seed, (which should be sav'd from either semi-double, or such single Flowers as are large, and have good Properties) you must have a Parcel of square shallow Boxes or Pots, which must be fill'd with a fresh, light, sandy Soil, laying the Surface very level; then sow your Seeds thereon as equally as possible, covering it about half an Inch thick with the same light Earth: The Time for this Work is about the Beginning of *August*: These Boxes or Pots should be plac'd where they may enjoy the Morning-Sun only until the Middle or latter End of *September*; at which Time they should

should be remov'd into a warmer Situation; and towards the End of *October*, they should be plac'd under a common Hot-bed Frame, where they may remain during the Winter and Spring Months, that they may be protected from hard Frosts, tho' they should be expos'd to the open Air at all Times when the Weather is mild. In *February* the young Plants will begin to appear above-ground; at which Time they must be carefully skreen'd from Frosts, otherwise it will prove very injurious to them: but you must never cover 'em at that Season, but in the Night, or in very bad Weather; for when the Plants are come up, if they are close cover'd, they will draw up very tall and slender, and thereby prevent the Growth of their Roots. In the Middle of *March*, if the Weather proves good, you may remove the Boxes out of the Frame, placing them in a warm Situation, observing if the Season be dry to refresh them now and then with a little Water, as also to keep them very clear from Weeds, which would soon over-spread the tender Plants, and destroy them, if permitted to remain.

Towards the latter End of *April* or the Beginning of *May*, these Boxes should be remov'd into a cooler Situation, for the Heat of the Sun at that Season would be too great for these tender Plants, causing their Blades to decay much sooner than they would if they were skreen'd from its Violence: In this shady Situation they should remain during the Heat of Summer, observing to keep them constantly clear from Weeds, but you must not place them under the Dripping of Trees, &c. nor should you give them any Water, after their Blades are decay'd, for that would infallibly rot the Roots. About the Middle or Latter-end of *August* you should sift a little light rich Earth over the Surface of the Boxes, and then remove them again into a warmer Situation, and treat them, during the Winter, Spring and Summer Months, as was before directed; and about the Middle of *August* you should prepare a Bed of light, rich, sandy Soil, in Proportion to the Quantity of your Seedling Plants, and having levell'd the Surface very even, you should take out the Earth from the Boxes in which your Plants were rais'd, into a Sieve, in order to get out all the Roots, which, by this time (if they have grown well) will be about the Thickness of a small Quill; these Roots should be plac'd upon the Bed at about two or three Inches asunder, observing to set the Bottom Part of their Roots downwards; then cover them over two Inches thick with the same light Earth: but as it will be impossible to get all the small Roots out of the Earth in the Boxes, so you should spread the Earth upon another Bed equally, and cover it over with light Earth; by which Method you will not lose any of the Roots, be they never so small.

These Beds must be arch'd over with Hoops, and in very hard frosty Weather they must be cover'd with Mats, &c. to protect 'em from Frost; and in the Spring, when the green Leaves are above-ground, if the Weather

should be very dry, you must refresh 'em with Water: but do this sparingly; for nothing is more injurious to these Bulbs, than too great Quantities of Moisture. During the Summer-season you must constantly keep the Beds clear from Weeds; but after the Blades are decay'd, you must never give them any Water: and in Autumn you should stir the Surface of the Bed with a very short Hand-fork, being exceeding careful not to thrust it so deep as to touch the Roots, which, if hurt, are very subject to perish soon after: Then sift a little fresh, light, rich Earth over the Bed about an Inch thick, or somewhat more, and in Winter cover 'em again, (as was before directed): In this Bed the Roots may continue until they flower, which is commonly five Years after sowing, observing to treat 'em, both in Summer and Winter, as before.

When their Flowers begin to shew themselves, you should mark all such as appear to have good Properties, by thrusting a small Stick down by each Root, which Roots, at the Time for taking them up, should be selected from the rest, and planted by themselves: Tho' I would by no means advise the rejecting any of the other Roots, until they have blown two Years, before which you cannot be ascertain'd of their Value. When the green Leaves of these Plants begin to decay, their Roots must be taken up; and the Earth of the Bed being rais'd into a Ridge, the better to shoot off the Moisture, they should be laid into the Earth again in an horizontal Position, leaving the green Leaves hanging downwards from the Roots, whereby the great Moisture contain'd in their very succulent Leaves and Flower-stalks is exhaled, and prevented from entering the Roots; which, when suffer'd to return into them, is very often the Cause of their Rotting: In this Ridge the Roots should remain until the Leaves are quite dried off, when they must be taken up; and after being clear'd of all manner of Filth, which would be hurtful to them, they must be laid up in Boxes, where they may be preserv'd dry until *September*, which is the proper Season for planting them again. The Method of doing this, shall be hereafter mention'd, when we treat of the Management of old Roots.

The *Hyacinth* of *Peru* may also be rais'd from Seeds in the same manner as the common *Hyacinths*, with this Difference only, that as they seldom lose their green Leaves or their Fibres, so their Roots must not be kept out of the Ground, but should be planted again immediately when they are taken up. The best Season for this Work is in *August*: And they should be planted in a Border expos'd to the Morning Sun; for if they are planted in a very hot Situation, the Flowers decay soon after they are expanded, so that they seldom continue in Beauty above a Week; whereas, if they are skreen'd from the violent Heat of the Sun, they may be preserv'd near three Weeks, and will have a greater Number of Flowers open at once upon the same Stem.

I shall now proceed to the Culture of such *Hyacinths* as have either been obtain'd from *Holland*, or are of our own Product from Seeds, that are very beautiful, and worthy to be preserv'd in Collections of good Flowers; and it hath been the want of Skill in the Management of these noble Flowers, which has occasion'd the ill Success most People have had with them in *England*, whereby they are almost intirely neglected, supposing their Roots degenerate after they have flower'd in *England*: which is a great Mistake; for were the Roots manag'd by the same Art as is practis'd in *Holland*, I am fully convinc'd they would thrive full as well in *England* as they do in *Holland*, or elsewhere, as I have experienc'd: for, from about an hundred Roots which I have receiv'd from *Holland* at two or three different Times, I have increas'd them to almost double the Number of strong Roots, all which flower'd in the Spring *Anno* 1730, stronger than they did when I first receiv'd them; and I dare say they were as large, and produc'd as many Flowers upon their Stems, as the same Sorts ever did in *Holland*: And by Letters which I have lately receiv'd from my very worthy ingenious Friend *James Justice Esq;* near *Edinburgh*, he hath succeeded so well in the Management of these Flowers, as to equal any of the *Dutch* Florists, in the Number and Strength of his Flowers; and he has rais'd great Quantities of Flowers from Seed of his own saving, from amongst which he has this Year obtain'd a most extraordinary fine one, which he calls the *Royal British Star*; the Height of its Stem was twenty Inches, upon which were twenty-three Bells or Flowers, plac'd in a pyramidal Order, each of which was very large and double, of an extraordinary white Colour on the Upper-part of the Petals, but the Lower-part or Centre of the Flower of a very deep Violet Colour. This Flower is thought, by several curious Gentlemen (who have seen the fine Collections of *Hyacinths* in the *Dutch* Gardens) to be equal to, if not exceeding any Flowers they have seen in *Holland*. But to proceed:

The Soil in which these Flowers do succeed best, is a light, sandy, fresh rich Earth, which may be compos'd after the following manner: Take half fresh Earth from a Common or Pasture Land which is of a sandy Loam; this should not be taken above eight or nine Inches deep at most; and if you take the Turf or Green-sward with it, it will still be better, provided you have time to let it rot; to this you should add a fourth-part of Sea Sand, and the other fourth-part of rotten Tanners Bark, or Cow Dung, either of which will do, provided they are well rotted: Mix these well together, and cast it into an Heap, where it may remain until you use it, observing to turn it over once in three Weeks or a Month. If this Compost be made two or three Years before it be us'd, it will be much the better: but if you are oblig'd to use it sooner, then it should be oftener turn'd, that the Parts may the better unite.

This Soil should be laid ten Inches deep on the Beds which are design'd for your *Hyacinths*; and you may lay a little rotten Cow Dung or Tanners Bark at the Bottom, which may be within reach of the Fibres: but it should by no means touch the Bulb. If the Soil be very wet where these Beds are made, you should raise them seven or eight Inches above the Surface; but if it be dry, they need not be rais'd above three Inches.

The manner of Preparing the Beds, is as follows: First, take all the former old Earth out of the Bed to the Depth you intend, then spread a little rotten Dung or Tan in the Bottom, laying it very level; upon this you should lay the above-mention'd Earth five Inches thick, levelling it very even; then score out the Distances for the Roots, which should be eight Inches square, in strait Rows each Way; after which, place your Roots exactly in the Squares, observing to set the Bottom-part downward; then cover the Roots five Inches deep with the same prepar'd Earth; being very careful, in doing of this, not to displace any of them: And if the Tops of these Beds are made a little rounding, to shoot off the Wet, it will be of Service, provided they are not made too high, which is a Fault the other way.

The best Season for planting these Roots, is towards the Middle or Latter-end of *September*, according to the Earliness or Lateness of the Season or the Weather which then happens: But I would advise you never to plant 'em when the Ground is extreme dry, unless there be a Prospect of some Rain soon after; for if the Weather should continue dry for a considerable Time after, the Roots would receive a Mouldiness, which will certainly destroy them.

These Beds will require no farther Care until the Frost comes on severe, at which Time they should have some Peas-haulm, or such-like Covering, laid over them, which will keep out the Frost better than Mats; and lying hollow, will admit the Air to the Surface of the Ground, and also permit the Exhalations to pass off, whereby the Earth will remain dry, and prevent the Roots from rotting, which has often happen'd when the Beds have been too close cover'd. But you must observe to take off this Covering whenever the Weather is mild, and only let it continue on in very hard Frosts; for a small Frost cannot injure the Roots before the green Leaves appear above-ground, which is seldom before the Beginning of *February*; at which time the Beds must be arch'd over with Hoops, that they may be cover'd either with Mats, Canvas, or some other light Covering, to prevent the Frost from hindring the Buds as they arise above-ground: but these Coverings must be constantly taken off every Day when the Weather is mild, otherwise the Flower-stems will be drawn up to a great Height, and become very weak, and the Pedicles of the Flowers will be long and slender, and so render'd incapable of supporting the Bells: which is a great Disadvantage to the Flowers;

for

for one of their greatest Beauties consists in the regular Disposition of the Bells.

When the Stems of the Flowers are advanced to their Height, before the Flowers are expanded, you should place a short Stick down by each Root, to which with a Wire form'd into a Hoop, the Stem of the Flowers should be fasten'd, to support them from falling, otherwise when the Bells are fully expanded, their Weight will incline them to the Ground, especially if they are permitted to receive a Shower of Rain.

During their Season of Flowering, they should be cover'd in the Heat of the Day from the Sun, as also from all heavy Rains; but they should be permitted to receive all gentle Showers, as also the Morning and Evening Sun; but if the Nights are frosty, they must be constantly defended therefrom: With this Management you may continue your *Hyacinths* in Beauty, at least one whole Month, and sometimes more, according to their Strength, or the Favourableness of the Season.

When their Flowers are quite decay'd, and the Tops of their Leaves begin to change their Colour, you must carefully raise the Roots out of the Ground with a narrow Spade, or some other handy Instrument, and then raise the Earth of your Beds into a high, sharp Ridge, laying the Roots into it in an horizontal Position, with their Leaves hanging out, by which means a great Part of the Moisture contain'd in their thick succulent Stalks and Leaves will evaporate, which if it were permitted to return back to the Roots, would cause them to rot and decay after they are taken up, which has been the general Defect of most of the *Hyacinths* in England.

In this Position the Roots should remain until the green Leaves are intirely dried up, which, perhaps, may be in three Weeks time, then you must take them out of the Ground, and wipe them clean with a soft woollen Cloth, taking off all the decay'd Parts of the Leaves and Fibres, putting them into open Boxes where they may lie singly, and be expos'd to the Air; but they must be preserv'd carefully from Moisture, nor should they be suffer'd to remain where the Sun may shine upon them: In this manner they may be preserv'd out of the Ground until September, which is the Season for replanting them again, at which Time you must separate all the strong flowering Roots, planting them in Beds by themselves, that they may make an equal Appearance in their Flowers; but the Off-sets and smaller Roots should be planted in another separate Bed for one Year, in which Time they will acquire Strength, and by the succeeding Year will be as strong as the older Roots.

The single and semi-double Flowers, should be planted also in a Bed by themselves, where they should be carefully shelter'd, as was directed before, from the Frost, until the Flowers are blown, at which time their Covering should be intirely removed, and they suffered to receive the open Air, which though it may soon deface the Beauty of the Flowers,

yet is absolutely necessary to promote their Seeding; and when the Seeds are quite ripe, you must cut off the Vessels and preserve them with the Seeds therein until the Season for sowing it. But you must observe, that after these Flowers have produc'd Seeds, they seldom flower so well again, at least not in two Years after, so that the best Method to obtain good Seeds, is to plant new Roots every Year for that Purpose.

The common *English* and *Starry Hyacinths* are very hardy Plants, as are some of the single Blue and White *Oriental* Sorts, and do increase very fast by Off-sets from the old Roots, so that it is hardly worth while to propagate them by Seeds: especially since it can scarcely be expected to receive any great Varieties from them: These Flowers, though common, are very pretty Ornaments in the Borders of the Flower Garden, where being intermix'd with other bulbous-rooted Flowers, they add to the Variety, and continue the Succession of Flowers a long time in the Spring; and as they are very hardy, and only require to be transplanted every other Year, so they are worthy of a Place in every good Garden.

The *Hyacinth* of *Peru* is one of the latest Flowers of all this Tribe, seldom appearing before the Middle, and sometimes not until the latter End of *May*: This, as I before observ'd, should have a Situation expos'd to the Morning Sun, and a light, rich Soil; but as this seldom loses its Leaves or Fibres intirely, so it cannot be kept long out of the Ground; the best Season for transplanting their Roots, is in *August* or *September*, at which Time the Off-sets should be taken from them, and the strong Roots planted again for flowering; but the small Roots should be plac'd in a Nursery-bed, until they have acquir'd Strength to flower. The Distance and Depth of planting these, being much the same with what I have already mention'd for the other *Hyacinth*, I shall forbear repeating it.

I shall add in this Place, another *Hyacinth*, which is now preserv'd in curious Collections of Exotick Plants; it was originally brought from the *Cape of Good Hope*, and being a Native of a warm Climate, will not endure the Cold of our Winters in the open Air; but for the Beauty of its Flowers, well deserves a Place in a Green-house; it is called,

HYACINTHUS; Africanus, tuberosus, flore caeruleo umbellato. Breyn. prod. The African *Hyacinth*, with a tuberosé Root and blue Flowers, growing in Umbels.

The Roots of this Plant should be put in Pots, filled with the same Earth as was directed for the other *Hyacinths*; these Pots, during the Summer-season, may be expos'd to the open Air with other Green-house Plants, and in Winter must be hous'd with them; the Time for transplanting the Roots, is toward the End of *March*, before the green Leaves are produc'd too far, after which it is not so safe to remove them: During the Time that their green Leaves are in Vigour, they must be frequently water'd, but when their Leaves begin to decay, it must be given them very

very sparingly; for much Wet at that time will rot their Roots: They should also have as much free open Air, when the Weather is mild, as they can possibly receive; for which Purpose they should be plac'd near the Windows of the Green-house, for they require only to be shelter'd from Frost and extreme cold Air, being in other respects very hardy.

This Plant is propagated by Off-sets taken from the old Roots, at the Time of transplanting them, which must be managed as hath been directed for the old Roots. The Flowers of this Plant are produc'd in *August* and *September*; but it seldom perfects Seeds in *England*.

HYACINTHUS. Tuberosus.

The Characters are;

It hath a tuberosé Root; the Stalk is erect, and surrounded with a leafy Covering, by Intervals; the Flowers are large, and of a Lilly-shape, being much longer and larger than those of the Bulbous Hyacinths.

The Species are;

1. HYACINTHUS; *Indicus, tuberosus, flore Hyacinthi Orientalis. C. B. P.* The Indian Tuberosé-rooted Hyacinth, commonly called the *Tuberosé*.

2. HYACINTHUS; *Indicus, tuberosus, flore pleno. Boerb. Ind. alt.* The Indian Tuberosé-rooted Hyacinth, with a double Flower, commonly call'd the *Double Tuberosé*.

The first of these Plants is very common in most Parts of *Europe*; the Roots of this Sort are generally brought from *Genoa* in great Plenty every *Spring*, by the Persons that bring over *Orange-Trees* for Sale. But the second Sort is very rare, and at present only in the Gardens of *Monf. de la Court* near *Leyden* in *Holland*, who obtain'd it from Seeds of the Single Kind some Years since; and altho' he has increas'd the Roots of this Flower so as to have many Hundreds of them, yet will he not part with a single Root to any other Person, but has destroy'd some Hundreds of them, because he would not be over-stock'd with them; which is an Instance of Narrowness of Mind and Ill-nature too common amongst the Lovers of Gardening.

These Plants are propagated by Off-sets taken from the old Roots, which send them forth in great Plenty: but as they require to be shelter'd from the Cold of our Winters, so this Method is seldom practis'd in *England*, because we can be furnish'd with fresh strong Roots annually from Abroad at a very cheap Rate: I shall therefore proceed to the Culture of those Roots which are brought over.

The Roots of this Plant generally arrive here in *February*, which is full early enough to plant them for the first Season: but in order to continue a Succession of their Flowers, they should be planted at three different Times. The first, at the Latter-end of *February*, or the Beginning of *March*; these will flower at the Latter-end of *May*, or Beginning of *June*. The second should be planted the Beginning of *April*; these will flower in *July*. The

third should be planted in the Beginning of *May*, which will flower in *August* or *September*, and some of them will continue till *October*. By which Method we may continue this fragrant Flower for four or five Months in Beauty.

When you are provided with the Roots, you must prepare a moderate Hot-bed, upon which should be plac'd a Parcel of small Flower-Pots fill'd with fresh, light, rich Earth; then having taken off the Filth and decay'd Leaves and Fibres of the Roots, as also the Off-sets, (which, if permitted to remain upon the Flowering Roots, will exhaust much of their Nourishment, and cause 'em to blow very weak) you must plant the Roots one into each separate Pot, observing that the Bud or Upperpart of the Root is but just cover'd with the Earth: for if they are bury'd too deep, they will sometimes miscarry.

These should have but little Water until they appear above-ground, but afterwards they require frequently to be refresh'd therewith; and as the green Leaves advance, so you must be careful to give them Air, in Proportion to the Heat of the Weather, and the Bed in which they are planted; for if they are forc'd too fast, it will cause their Flower-stems to run up very weak and tall; but the Flowers will be fewer in Number, and much smaller, than when they are brought up hardier. As the Stems advance, so you must raise your Coverings, and increase the Proportion of free Air; and in the Middle of *May* a slight Covering with Mats will be sufficient; for then you must harden them by Degrees to bear the open Air. When the Flowers begin to open, the Pots should be remov'd into Shelter; for if they are permitted to continue abroad, the Wet will soon deface the Flowers: but if they are screen'd from Wet, and the violent Heat of the Sun, they will continue in Beauty a long Time.

Those Roots which are planted later in the Season will require a less Degree of Heat; so that if the Hot-bed does but bring them well up above-ground, the Heat of the Sun will be sufficient for them afterwards, provided the Season be not very cold and wet; for if it should happen to prove so, you must add fresh Warmth to the old Bed, or remove the Pots to a new one to bring them forward, otherwise they will not flower that Season.

The Double-flower'd Sort being propagated by Off-sets, I shall set down the Method us'd by *Monf. de la Court*, as I observ'd when I was at *Leyden*. In the *Spring* he takes up the old Roots before they begin to shoot, from which he takes off all the Off-sets; then he plants the strong Roots in the manner above directed for the single Sort: but the Off-sets he plants about four Inches asunder, upon a fresh Hot-bed cover'd over with very rich Earth; this Bed is arch'd over with Hoops, and closely cover'd with Canvas and Mats, which are continu'd on during the *Spring* Months while the Weather is cold; but as the *Summer* advances, so the Coverings are remov'd,

remov'd, and the Plants suffer'd to enjoy the free open Air until the *Autumn* following, that the Nights begin to be cold, when he covers them as before until the Leaves are quite wither'd off, at which Time he takes up some of them, and preserves their Roots in dry Sand in the Greenhouse; but others he suffers to continue in the Beds until the succeeding *Spring*, observing to cover them, to preserve the Roots from Frosts; which if they are not well secured from, as also from too much Wet, will intirely destroy them.

By this Management, I observ'd some Hundreds of Roots of this Plant, in the Gentleman's Garden above-mention'd, which were in Flower, and a large Quantity of younger Roots, which were for the succeeding Year; (for these Roots do never flower two Years successively): But were it not for the Rarity, more than the Beauty of the Flower, few People would covet to have it; for the single Sort is by far the fairer Flower, and opens much better, as do those of the *White Lilly*, and some others of that Kind, the Single Flowers of which are much preferable to the Double; but the Double being more rare, are often coveted.

HYDROCOTYLE; [*of ὕδωρ Water, and κῆντρον a Cavity*, because this Plant has a Cavity in the Leaves, and grows in Marshes.] Water Navel-wort.

This Plant grows in great Plenty in moist Places in most Parts of *England*, and is never cultivated for Use, so I shall pass it over with only naming it.

HYDROLAPATHUM; *vide* *Lapathum*.

HYDROPIPER, the common biting Arse-smart, which grows in great Plenty in moist Places near Ditches Sides almost every where.

HYDROSTATICKS, [*ὑδροστατική, of ὕδωρ Water, and στατή, of σταθερά standing, of ἵσχυς I stand or stop*; *Hydrostaticks* being conceiv'd as the Doctrine of the Equilibrium of Liquors] is the Doctrine of the Gravitation of Fluids; or it is that Part of the Mechanicks which considers the Weight or Gravity of Fluid Bodies, particularly of Water, and of solid Bodies immerg'd therein.

To *Hydrostaticks* belong whatever relates to the Gravities and Equilibria of Liquors; with the Art of weighing Bodies in Water, in order to estimate the specifick Gravities.

Of the Use of this Science in *Horticulture*, the Reverend Mr. *Stephen Hale*, in his excellent Treatise of *Vegetable Statics*, has given many Examples, by Experiments, shewing the Quantities of Moisture imbib'd and perspir'd by Plants and Trees, necessary to be known, in order to promote the Business of Vegetation.

Some of the most useful Heads of this Science, are,

1. That the upper Parts of all Fluids press upon the Lower.
2. That a lighter Fluid may gravitate or press upon a heavier.

3. That if a Body that is contiguous to the Water, be altogether or in part lower than the upper Surface of the Water, the lower Part of the Body will be press'd upwards by the Water which touches it beneath.

4. There needs only a competent Weight of an external Fluid to account for the rising of Water in Pumps, &c.

5. If a Body be plac'd under Water, so that its uppermost Surface lie parallel to the Horizon, the direct Pressure that it sustains is no more than that of a Column of Water, whose Base is the horizontal Superficies of the Body, and its Height the perpendicular Depth of the Water. And if the Water which leans on the Body be contain'd in Pipes, which are open at both Ends, the Pressure of the Water is to be estimated by the Weight of a Pillar of Water, the Base of which is equal to the lower Orifice of the Pipe, and whose Height is equal to a Perpendicular which reaches from thence to the Top of the Water, altho' the Pipe should be much inclin'd any way, or tho' it should be ever-so irregularly shap'd, and much broader in some other Place than the Bottom.

6. A Body which is immers'd in a Fluid, sustains a natural Pressure from the Fluid, which also increases as the Body is plac'd deeper beneath the Surface of the Fluid.

7. The Reason why Water ascends in Syphons, and by which it flows through them, may be explain'd from the external Pressure of some other Fluid, without having Recourse to the Abhorrence of a Vacuum.

8. The most solid Body, which will sink by its own Weight at the Surface, yet, if it be plac'd at a Depth twenty times greater than that of its own Thickness, it will not sink, if its Descent be not assisted by the incumbent Water.

9. If a Body which is specifically lighter than a Fluid, be immers'd in that Fluid, it will rise with a Force proportionable to the Excess of Gravity in that Fluid.

10. If a Body which is heavier than a Fluid be immers'd, it will sink with a Force that is proportionable to the Excess of its Gravity.

11. If any Vessel be fill'd with Water or any other Liquor, the Surface of which is capable of being even, it will continue so till disturb'd by some other external Cause.

12. When the Fluids are press'd, they are press'd *undequaque*, i. e. on all Sides.

How far the Knowledge of any of these Properties of Fluids may conduce to the Philosophical Improvement of Gardening, and the Business of Vegetation, will be more clearly perceiv'd, when well consider'd by the ingenious Artist, then being set forth by Words.

HYGROMETER, [*ὑγρομετρίον, of ὕγρον moist, and μέτρον measure, of μέτρον to measure*] is a Machine or Instrument contriv'd to shew or measure the Moistness and Driness of the Air, according as it abounds with moist or dry Vapours, and to measure and estimate the Quantity of such Moisture and Driness.

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There

There are divers Kinds of *Hygrometers*; for whatever Body either swells or shrinks by Driness or Moisture, is capable of being form'd into an *Hygrometer*, such are Woods of most Kinds, particularly *Asb*, *Deal*, *Poplar*, &c. such also is a *Cord*, *Cat-gut*, &c.

Stretch a Hempen-cord or *Fiddle-string* along a Wall, bringing it over a Truckle or Pulley, and to the other End tie a Weight, unto which fit a Style or Index, on the same Wall fit a Plate of Metal divided into any Number of equal Parts, and the *Hygrometer* is complet.

For it is a Matter of undoubted Observation, that Moisture sensibly shortens the Length of Cords and Strings, and that as the Moisture evaporates, they return to their former Length; and the like may be said of a *Fiddle-string*.

The Weight therefore, in the present Case, upon an Increase of the Moisture of the Air, will ascend; and upon a Diminution of the same, will descend.

Hence as the Index will shew the Spaces of Ascent and Descent, and those Spaces are equal to the Increments and Decrements of the Length of the Cord or Gut, the Instrument will discover whether the Air be more or less humid now, than it was at another given Time.

The ordinary Contrivance with Whip-cord, is one of the easiest; for that will infallibly shorten and lengthen as the Air grows moister and drier.

Some recommend a *Cat-gut* as the best, which may be a Yard in Length, suspended, having a Plummot or Piece of Lead, with an Index or Pointer, hanging at the lower End, by means of which the *Cat-gut* will twist or untwist as the Air dries or moistens, and shorten and lengthen so as to raise and sink the Plummot with the Index; and this Index will point out the Degree sought for.

The Weight of this Lead or Plummot should be about two Ounces.

Some Persons, who approve a fine Whip-cord instead of *Cat-gut*, use a greater Weight of Lead: The Twisting and Untwisting of the *Cat-gut* or *Whip-cord* will make the Lead with the Index turn round, as well as rise and fall: The Degrees may be made upon an open Skrew of Brass within, with which the Plummot and Index has its Motion.

When you are provided with a *Barometer* and *Hygrometer*, compare the Motions of the one with the other, in order to judge what Proportion the Rise or Fall of the Quicksilver in the *Barometer* bears to the twisting of the *Cat-gut* or *Whip-cord*; the Degrees of which Motion may be observ'd by the Index or Pointer of the *Hygrometer*, and at the same Time both these must be compar'd with the Rising and Falling of the Spirit in a *Thermometer*, to know what Degree of Heat or Cold attends every different Change of Weather.

HYGROSCOPE, [of *ὑγρὸς* moist, and *σκοπεῖν* to view or consider] a Machine the same as the *Hygrometer*, and for the same Uses.

These Instruments are of good Use in Conservatories for measuring or shewing the Dampness or Driness of them in the Winter-season.

HYOSCYAMUS, [of *ὄς* a Swine, and *ῥίαν* a Bean, q. d. *Hog's-bean*; and it is so call'd because its Fruit resembles a *Bean*; and as *Ælianus* relates, when wild Sows have eaten of the *Hyoscyamus*, they are immediately seiz'd with a violent Convulsion, so that they die, unless they throw themselves into Water, where, eating the Crab-fishes, they are restor'd to their former Health.] *Hen-bane*.

The Characters are;

The Leaves are soft and hairy, growing alternately upon the Branches; the Cup of the Flower is short, and Bell-shap'd, and divided into five Segments; the Flower consists of one Leaf, the bottom Part of which is tubulose, but is expanded at the Top, and divided into five Segments, having five obtuse Stamina; the Fruit, which is enclosed with the Calix, resembles a Pot with a Cover to it, and is divided by an intermediate Partition into two Cells, which contain many small Seeds.

The Species are;

1. *HYOSCYAMUS*; *vulgaris*, *vel niger*. C. B. P. Common Black *Hen-bane*.

2. *HYOSCYAMUS*; *albus*, *major*, *vel tertius Dioscoridis*, & *quartus Plinii*. C. B. P. Greater White *Hen-bane*.

3. *HYOSCYAMUS*; *major*, *albo similis*, *umbilico floris atro-purpureo*. T. Cor. Great *Hen-bane* like the White, but with a dark Purple Bottom to the Flower.

4. *HYOSCYAMUS*; *minor*, *albo similis*, *umbilico floris virenti*. Jussieu. Lesser *Hen-bane* like the White, with a green Bottom to the Flower.

5. *HYOSCYAMUS*; *rubello flore*. C. B. P. *Hen-bane*, with a reddish-colour'd Flower.

6. *HYOSCYAMUS*; *Creticus*, *luteus*, *major*. C. B. P. Great Yellow *Hen-bane* of Candia.

There are several other Varieties of this Plant, which are preserv'd in Botanick Gardens, to add to their Numbers of Plants; but since they are rarely cultivated for Use, so I shall forbear to say any thing of them in this Place.

The first of these Sorts is very common in England, growing upon the Sides of Banks and old Dung-hills almost every where. This is a very poisonous Plant, and should be rooted out in all Places where Children are suffer'd to come; for in the Year 1729. there were three Children poison'd with eating the Seeds of this Plant, near *Tottenham-Court*; two of which slept two Days and two Nights before they could be awaken'd, and were, with Difficulty, recover'd; but the third, by being older and stronger, escaped better.

The second Sort is by most Authors suppos'd to be the true white *Hen-bane* of the Shops; the Seeds of which should be us'd in Medicine, tho' there is very little Difference in the Seeds of that and the third and fourth Sorts, either of which may probably do. The other Sorts are of no Use or Beauty; but whoever hath a Mind to cultivate any of these Plants, may sow their Seeds in the Spring upon a light, dry, undung'd

dung'd Soil : And when the Plants are come up, they should be transplanted out, allowing them two Feet Distance each Way : The second Summer they will produce Flowers and Seeds, and soon after the Roots perish.

HYPERICUM ; ἵππεύριον, *q. d.* an Herb, the Image of which is eminent, or because it has respect to, or beholds the Sun.] St. John's-wort.

The Characters are ;

It hath a fibrose Root ; the Leaves grow opposite by Pairs at the Joints of the Stalks ; the Flower-cup consists of one Leaf, which is divided into five Parts, and expanded ; the Flower, which consists of five Leaves, expands in Form of a Rose, having many Stamina in the Center surrounding a conical Ovary, which becomes a three-corner'd pointed Fruit, and is divided into three Cells, containing many small Seeds.

The Species are ;

1. **HYPERICUM** ; *vulgare*. C. B. P. Common St. John's-wort.

2. **HYPERICUM** ; *Afcyron dictum*, caule quadrangulo. *J. B.* St. John's-wort, with a square Stalk, commonly call'd St. Peter's-wort.

3. **HYPERICUM** ; *fetidum, frutescens*. *Tourn.* Stinking, shrubby St. John's-wort.

4. **HYPERICUM** ; *frutescens, Canariense, multiflorum*. *Hort. Amst.* Shrubby St. John's-wort from the Canaries, with many Flowers.

5. **HYPERICUM** ; *Oriente, flore magno*. *T. Cor.* Eastern St. John's-wort, with a large Flower.

The first and second Sorts are both very common Plants, growing in the Fields in most Parts of England ; the first is us'd in Medicine, but the second is of no Use : These are rarely propagated in Gardens, but I chuse to mention them in order to introduce the other Sorts, which deserve a Place in every good Garden.

The third and fourth Sorts are shrubby Plants, which are very proper to intermix with other flowering Shrubs of the same Growth, where, by their long Continuance in Flower, they will make a very handsome Appearance. The third Sort is of an humble Stature, seldom rising above four Feet in Height ; but the fourth will grow to the Height of seven or eight Feet.

These two Sorts are propagated by Suckers, which are plentifully sent forth from the old Plants. The best Season for taking off these Suckers is in *March*, just before they begin to shoot : They should be planted in a light dry Soil, in which they will endure the severest Cold of our Climate very well. They may also be propagated by Cuttings, which should be planted at the same Season ; or by Seeds, which must be sown in *August* or *September*, which is as soon as they're ripe ; for if they are kept till Spring, few of them will grow : But as they multiply so fast by Suckers, the other Methods of propagating them are seldom practis'd in England.

The only Care these Shrubs require, is, to clear them from Suckers every Spring, and to cut out all decay'd and luxuriant Branches, in order to reduce them to a regular Figure : They produce their Flowers in *July*, and con-

tinue flowering until the End of *September*, which renders them very agreeable, but their Leaves, when bruis'd, do emit a very rank Odour.

The Eastern Sort is also an abiding Plant, but it seldom rises above eighteen Inches or two Feet high : This is propagated by parting the Roots, and planting Cuttings in the Spring ; it is somewhat tenderer than the last, but will endure the Cold of our ordinary Winters in the open Air, provided it be not too much expos'd to the cold Winds : It may also be propagated by sowing the Seeds in *March* upon a Bed of light Earth in an open Situation ; and when the Plants are large enough to be transplanted, they may be plac'd in the warm Borders of the Pleasure-Garden, and the Summer following they will produce their Flowers in large Quantities upon the Tops of the Branches, which being of a large Size, and a bright yellow Colour, do make a very handsome Shew.

HYPERICUM FRUTEX ; *vide* Spirea.

HYPOPHYLOSPERMOUS Plants ; [of which under, ὑποφύλλον a Leaf, and ἐν τῇ σπείρῃ a Seed] are such Plants as bear their Seeds on the Backsides of their Leaves.

HYSSOPUS, [takes its Name from the Hebrew Word חִסְוִי, in which Language *Hyssop* signifies an holy Herb, or for purging or cleansing sacred Places, as it is said in the *Psalms*, *Purge me with Hyssop* ; but what Plant the *Hyssop* of the Antients was, is not known ; but that it seems to have been a low Plant, because *Solomon* is said to have describ'd the Plants from the Cedar to the *Hyssop*.] *Hyssop*.

The Characters are ;

It is a verticillate Plant, with long, narrow Leaves ; the Galea (or Crest) of the Flower is roundish, erect, and divided into two Parts ; the Barba (or Beard) is divided into three Parts ; the middle Part is hollow'd like a Spoon, having a double Point, and is somewhat wing'd ; the Whorles of Flowers are short, and at the lower Part of the Stalk are plac'd at a great Distance, but towards the Top are closer join'd, so as to form a regular Spike.

The Species are ;

1. **HYSSOPUS** ; *officinatum, caerulea, seu spicata*. C. B. P. Common *Hyssop* of the Shops, with blue Flowers growing in a Spike.

2. **HYSSOPUS** ; *vulgaris, alba*. C. B. P. Common *Hyssop*, with a white Flower.

3. **HYSSOPUS** ; *rubro flore*. C. B. P. *Hyssop*, with a red Flower.

4. **HYSSOPUS** ; *montanum, Macedonicum, Valerandi Doutez*. *J. B.* Mountain Macedonian *Hyssop*.

5. **HYSSOPUS** ; *humilior, myrtifolia*. *H. R. Par.* Dwarf Myrtle-leav'd *Hyssop*.

All the Sorts of *Hyssop* are propagated either by Seeds or Cuttings : If by the Seeds, they must be sown in *March* upon a Bed of light sandy Soil ; and when the Plants come up, they should be transplanted out to the Places where they are to remain, placing them at least a Foot asunder each way : But if they are

are design'd to abide in those Places for a long Time, two Feet Distance will be small enough; for they grow pretty large, especially if they are not frequently cut, to keep them within compass. They thrive best upon a poor dry Soil, in which Situation they will endure the Cold of our Climate better than when they are planted on a richer Soil. If you would propagate them by Cuttings, they should be planted in *April* or *May*, in a Border where they may be defended from the violent Heat of the Sun; and being frequently water'd, they will take Root in about two Months; after which, they may be transplanted where they are to continue, managing them as was before directed for the Seedling Plants.

The first Sort was formerly more cultivated than at present in *England*, that being the Sort commonly us'd in Medicine. The other Species are preserv'd in curious Gardens for their Variety, but they are seldom cultivated for Use.

It hath been a great Dispute amongst modern Writers, whether the *Hyssop* now commonly known, is the same which is mention'd in Scripture: About which, there is great room to doubt; there being very little Grounds to ascertain that Plant; tho' it is most generally thought to be the *Winter Savory*, which Plant is now in great Request amongst the Inhabitants of the Eastern Countries, for Outward Washings or Purification.



J A

JACEA, [of *Jacere*, Lat. to lie along, because this Plant often lies on the Ground.] Knap-weed.

The Characters are;

It is one of the *Herbæ Capitatæ* (or Headed Plants) which is destitute of Spines: The Calix (or Cup) is squamose: The Borders of the Leaves are commonly equal, being neither serrated nor indented: The Florets round the Border of the Head are barren; but those plac'd in the Centre are succeeded each by one Seed, having a Down adhering to it.

The Species are;

1. **JACEA**; *nigra, pratensis, latifolia*. C. B. P. Broad-leav'd Meadow black Knap-weed.
2. **JACEA**; *cum squamis pennatis, five capite villosa*. J. B. Woolly-headed Knap-weed.
3. **JACEA**; *montana, candidissima, stæbes foliis*. C. B. P. Mountain Knap-weed, with very white Leaves.
4. **JACEA**; *Lusitanica, sempervirens*. H. R. Par. Portugal Ever-green Knap-weed.
5. **JACEA**; *Epidaurica, candidissima & tomentosa*. Tourn. White Woolly Knap-weed of Ragusa.
6. **JACEA**; *cyanoides, echinato capite*. C. B. P. Prickly-headed Knap-weed.

There are great Varieties of these Plants, which are preserv'd in curious Botanick Gardens for Variety: But there being very few of them cultivated for Use or Beauty, I shall not trouble myself or the Reader with an Enumeration of their several Names here; those above-mention'd being the handfomest, and best worth cultivating.

They are all propagated by Seeds, which should be sown in *March* upon a Bed of light rich Earth; and when they are come up, they may be transplanted into a Nursery-bed in some obscure Part of the Garden, at about ten Inches or a Foot asunder, where they may continue until the *Michaelmas* following, at which Time they may be transplanted into the Middle of large Borders in the Parterre Garden, where they may remain to flower: But the fifth Sort being tender, should be planted into Pots, and shelter'd from great Frosts in Winter, which, if they are expos'd to, will destroy them. The sixth Sort is an Annual Plant, which should be planted out in *May*, where it is design'd to remain, and in *June* it will flower, and the Seeds will ripen in *August*. The first Sort is a Native of *England*, and is very common in Pasture Lands, especially upon the Sides of Banks, or Foot Paths: This is seldom cultivated in Gardens.

These Plants may deserve a Place in large Gardens, for Variety; but they are not proper for small Gardens, their Branches taking up too much Room: And their Flowers having no great Beauty to recommend them, it is hardly worth excluding better Plants to make Room for them.

JACOBÆA, [so call'd of *St. James*, as says *Johannes Baubinus*, because it is said to grow about the Chapel of *St. James* in *Spain*.] Ragwort.

The Characters are;

It hath a radiated Flower, the Tube of which is almost of a cylindrical Figure, and the Seeds are fasten'd to a Down; to which may be added, the Leaves are deeply laciniated, or jagged.

The Species are;

1. **JACOBÆA**; *maritima*. C. B. P. Ragwort.
2. **JACOBÆA**; *Africana, frutescens, flore amplo purpureo, elegantissimo senecionis folio*. Volk. Shrubby African Ragwort, with an ample purple Flower, and Leaves like Groundsel.
3. **JACOBÆA**; *Africana, frutescens, foliis incisiss & subtus cineraceis*. Com. Rar. African Shrubby Ragwort, with cut Leaves, and the under-part of an Ash Colour.
4. **JACOBÆA**; *Africana, frutescens, foliis absinthii umbelliferi incanis*. H. A. Shrubby African Ragwort, with hoary Leaves like the umbellated Wormwood.

There are great Varieties of these Plants known to the Curious in *Botany*, most of which are but of little Beauty, and being some of them Natives of *England*, are seldom cultivated in Gardens; but these here mention'd do deserve a Place in every good Collection of Plants.

The first Sort was formerly nurs'd up with great Care, and preserv'd in Winter amongst Oranges,

Oranges, Myrtles, &c. in Green-houses; but of late it has been transplanted into the open Air, where it is found to thrive exceeding well, and, if planted in a dry Soil, and warm Situation, will very well endure the severest Cold of our Climate.

This Plant, tho' there is no great Beauty in its Flowers, yet for the Oddness of its hoary, regular, jagged Leaves, deserves to have a Place in every good Garden.

The second Sort is preserv'd, for the Beauty of its fine purple Flowers, which do continue a long Time, and growing in large Bunches, afford an agreeable Prospect.

The third and fourth Sorts grow to the Height of five or six Feet, and will abide several Years, if carefully preserv'd in Winter from extreme Cold: These are commonly preserv'd in the Green-house among other Exotick Plants, for their Variety.

All these Sorts may be propagated by Seeds or Cuttings: But if you propagate them by Seeds, you should sow them in *March* upon a Bed of light Earth; observing to water the Bed frequently in dry Weather, otherwise the Plants will not come up. About the Middle of *May*, if your Seeds should succeed well, the Plants will be fit to transplant out; at which Time you should put some of the three last Sorts into Pots fill'd with light fresh Earth, setting them in the Shade until they have taken fresh Root; after which they may be expos'd in an open Situation until the latter End of *October*, when they must be remov'd into Shelter. During the Winter-season they must be frequently water'd, without which they will soon decay; and in Summer they must be often prun'd, especially the second and third Sorts, to make them regular, otherwise they are apt to be very rude and unsightly, for they grow very vigorously.

The second Sort will produce Flowers and Seeds the first Year, and is often treated as an Annual Plant; but if it be hous'd in the Winter, it will live very well for two Years. They should be renewed every Year or two at least, otherwise they are subject to decay. The Cuttings whereof may be planted in a shady Border, in any of the Summer Months, which, if carefully water'd, will take Root in a Month's Time, whereby they may be greatly increased.

The *Sea Ragwort* may be also propagated by Cuttings or Slips, which must be planted and managed as the others, and, when they are rooted, may be transplanted into a warm Situation, where they may continue to flower and seed. It is very subject to degenerate when rais'd from Seeds, whereby the Whiteness, which is the greatest Beauty of this Plant, is greatly diminish'd, especially upon the upper Parts of their Leaves; so that the surest Method is, to propagate it by Cuttings.

JALAPA: [It is call'd *Marvel of Peru*, because of its Beauty: Hence, by the *French*, it is call'd *Merveille*, and *Belle de Nuit*.] *Jalap*, or *Marvel of Peru*.

The Characters are;

It hath a long, thick, fleshy, succulent Root: The Leaves, which resemble those of Nightshade, grow by Pairs opposite upon the Branches: The Stalks and Branches are very full of Knots: The Flower consists of one Leaf, and is shap'd like a Funnel: In the Centre of the Flower is plac'd the Ovary, inwrapp'd in one of the Flower-cups, which becomes an oblong, five-corner'd, umbilicated Fruit, consisting of a mealy Nut.

The Species are;

1. *JALAPA; flore flavo. Tourn. Jalap, or Marvel of Peru, with a yellow Flower.*

2. *JALAPA; flore purpureo. Tourn. Jalap, or Marvel of Peru with a purple Flower.*

3. *JALAPA; flore exalbido. Tourn. Jalap, or Marvel of Peru, with a whitish Flower.*

4. *JALAPA; flore ex rubro, luteo & albo mixto. Tourn. Jalap, or Marvel of Peru, with red, yellow, and white Flowers mix'd upon the same Plant.*

5. *JALAPA; flore ex albo & purpureo elegantissime variegato. Jalap, or Marvel of Peru, with white and purple Flowers finely variegated.*

6. *JALAPA; parvo flore. Tourn. Jalap, with a small Flower.*

7. *JALAPA; officinarum, fructu rugoso. Tourn. True Jalap of the Shops, with a rough Fruit.*

These Plants are all propagated by Seeds, which should be sown upon a moderate Hot-bed in *March*; and when they come up, they should be transplanted into another Hot-bed, at six Inches Distance from each other; and when they have taken Root, the Glasses must be rais'd every Day, that the Plants may have a great deal of Air, otherwise they are very subject to be drawn up tall and weak; nor can they be recover'd to a sufficient Strength again in a Month's Time, if once they are thus drawn. When the Plants are grown to be a Foot high, they should be put into Pots fill'd with rich light Earth, which should be plung'd into a very moderate Hot-bed, to facilitate their taking Root: And in removing them, you must be very careful to preserve as much Earth to their Roots as you can; for their Roots have but few Fibres to retain it in a Ball, as many other Plants will do: And it sometimes happens, when the Root is left bare, it seldom takes fresh Hold of the Ground, at least not in a considerable Time, so that the Plants will make but a poor Figure that Season. When they are transplanted into the Pots, and have taken Root again, they should be harden'd to endure the open Air; for they are not very tender; but on the contrary, they will not thrive well, if too much drawn or forc'd in the Hot-bed. In the Middle of *May* the Pots may be remov'd into the Places where they are design'd to be continu'd for that Season; observing to support the Branches with a strong Stake, and to water them as often as they require it. You may also in *May* plant some of them into the Middle of the large Borders of the Pleasure-Garden, doing it carefully, and observing to shade and water them until they have taken Root; after which, they will require

quire no farther Care but to support them from being broke down by the Winds, which they are very subject to be, especially when their Heads are large.

The Plants thus rais'd, will grow to the Height of three or four Feet, and spread their Branches very wide, (especially if the Roots have Room in the Pots) and their Flowers will begin to appear in *June*, and they will continue constantly flowering until the Frost prevents them; which, together with the great Diversity of Colours in the Flowers upon the same Plant, renders them valuable to every curious Person. The Flowers of these Plants never expand in the Day-time while the Sun is hot, but in the Evening, when the Sun declines, they begin to open, and do continue expanded until the Sun shines warm upon them the next Day, so that when it happens to be cloudy Weather, as also late in the Autumn, when the Weather is cool, the Flowers will remain open most Part of the Day.

As the Flowers are produc'd successively almost every Day, so the Seeds are in a short time after ripe, and do soon fall to the Ground; so that when your Seeds begin to ripen, you must carefully look for them upon the Ground twice a Week, otherwise, if they lie too long upon the Ground, and there should fall some Rain, they will sprout, and be good for nothing: In sowing these Seeds, you should be careful to take them from such Plants as produc'd the greatest Variety of Flowers; for if you save them from such as produce only plain-colour'd Flowers, the Seeds will always produce the same Sort, and those with yellow and red variegated Flowers will constantly produce the same, these never varying from the Red and Yellow to the Purple and White, though they will sometimes degenerate into plain yellow or red Flowers, as will the other into plain Purple or White, but they will constantly retain one or both of their original Colours.

Altho' in the above-written Culture of these Plants, I have directed their Seeds to be sown on a Hot-bed, yet they may be propagated by sowing them in a warm Border of light Earth toward the latter End of *March*; and when the Plants come up, they should be transplanted as before directed: In which Method they will succeed very well, but will not flower so soon by a Month or six Weeks as those rais'd on the Hot-bed, nor will the Plants grow so large.

When the Frost has pinch'd the Leaves and Stems of these Plants, you should take up their Roots, which should be laid to dry, and then may be preserv'd in dry Sand all the Winter, if secur'd from the Frost; and in the following Spring these Roots should be planted into large Pots, and plung'd into a moderate Hot-bed, to promote their taking Root; and when the Shoots appear above-ground, they should be treated as was directed for the Seedling Plants, hardening them by degrees to endure the open Air. The Plants so rais'd will be much larger than the Seedlings, and will flower earlier in the Year.

These Plants are all affirm'd by *Pere Plumier* to be different Sorts of Jalap; but the seventh Sort, he says, is the particular Plant, whose Root is commonly us'd in Medicine. But I have been since informed by my worthy Friend Mr. *William Housloun*, that the Jalap is the Root of a *Convolvulus*, and is not akin to either of these Plants.

JANUARY: *Work to be done in the Kitchen Garden.*

If the Weather be open, you must continue dunging and trenching of your Quarters for such Crops as are to be sown or planted the succeeding Months; and in warm Banks situated under Walls, Pales or Hedges, you may plant your first Crop of *Windsor Beans*, as also some early *Peas* to succeed those sown in Autumn; sow *Spinage*, *Radishes*, *Carrots*, and early *Salletting* on warm Borders, and make Hot-beds to sow early *Cucumbers* and *Melons*, as also for *Asparagus* to succeed those made in December.

You must now look carefully after your *Cauliflower* Plants and *Lettuce*, which were planted under Glasses in *October*, to give them Air if the Weather be mild; as also to pick off all rotten or decay'd Leaves, which if suffer'd to remain upon the Plants, very often destroy them.

Towards the latter End of this Month (if the Weather be mild) you may transplant *Cabbages*, *Carrots*, *Parfnips*, and *Turnips* for Seed; observing to hang up the *Cabbages* by their Stalks two or three Days in a dry Place, that the Moisture may drain out from between their Leaves, otherwise it will be apt to rot them.

If this Month should prove hard Frost, (as it often happens) you must carefully cover your tender Plants to secure them therefrom; and you may wheel Dung upon the Ground, tye and repair Reed-Hedges, and prepare your Seeds against the Alteration of the Weather, when your Time will be fully employ'd in putting them into the Ground.

Product of the Kitchen-Garden.

You have now *Cabbages*, *Savoys*, *Broccoli*, *Parfnips*, *Turnips*, *Carrots*, *Potatoes*, *Leeks*, *Cellery*, *Endive*, *Onions*, *Garlick*, *Schalots*, *Beets*, *Skirrets*, *Boor-cole*, and *Spinage*: And in Hot-beds, *Asparagus*, which was planted in *November*; as also divers Sorts of *Sallet-herbs*, as *Lettuce*, *Cresses*, *Turnip*, *Rape*, *Radish*, *Mustard*, and *Mint*.

Work to be done in the Fruit-Garden.

If the Weather should prove frosty, you must lay Mulch round the Roots of such Fruit-Trees as were planted the *October* before, provided it is not done already, and cover your Fig-Trees against the Walls, which will preserve their tender Shoots, and not only cause the Fruit to come out early, but the Trees will produce a greater Quantity.

In mild Weather you may continue pruning all hardy Fruit-Trees, as *Pears*, *Apples*, and *Vines*;

Vines; but it will be better to defer all Stone-Fruits till the next Month: Towards the latter End of this Month, you may cut Grafts of all early Fruit-Trees, laying them in the Earth until next Month, when it will be a proper Season for grafting them.

You should also prepare such Borders as are design'd to be planted with Fruit-Trees the next Month, by laying therein a good Quantity of fresh Earth, stirring and levelling it as it is to remain.

Prune all Standard or Orchard Fruit-Trees, by cutting off all decay'd Branches, and such as are very luxuriant, or that lie cross each other, and are ill situated.

Mend and Repair all your decay'd Espaliers with new Poles, and plash and tie your Fruit-Trees thereto, observing to train their Branches horizontally, and at proper Distances.

Fruits in Prime, and now lasting.

Pears; *St. Germain*, *Virgoulée*, *Winter Boncretien*, *Colmar*, *Double-Flower*, *Epine d'Hyver*, *Martin Sec*, *Royal d'Hyver*, *Citron d'Hyver*, *Ambrette*, *Mervaille d'Hyver*, with many others of less Note: And for Baking, the *Cardillac*, *Black Pear of Worcester*, *English Warden* and *Pickering*.

Apples; *Golden Pippen*, *Nonpareil*, *French Pippen*, *Golden Russet*, *Wheeler's Russet*, *Pile's Russet*, *Kentish Pippen*, *Holland Pippen*, *Aromatick Pippen*, *Harvey Apple*, *Winter Pearmain*, *Monstrous Rennet*, *Pear Russet*, *Aromatick Russet*, with many others. Also *Nuts*, *Almonds*, *Services*, and some *Medlars*.

Work to be done in the Pleasure-Garden and Wilderness.

In severe Weather, you must cover all tender Flowers; such of them as are not come up above-ground, may be cover'd with *Peas-baulm*; but those that are already up, should be arch'd over with Hoops, and cover'd with Mats, Canvas, &c. over which should be laid some *Wheat-straw* or *Pease-baulm*, if the Frost be very severe; but whenever the Weather alters, you must uncover them, for if they are kept too closely cover'd, they will be apt to grow mouldy and decay.

In mild Weather you may plant such Roots of *Anemonies*, *Ranunculus's*, and *Hyacinths* as were kept out of the Ground till now, in order to have them flower after the others are past; but this should not be done when the Earth is too wet.

Toward the End of this Month, if the Weather be mild, you should pick off all decay'd Leaves from your *Auricula's*, taking as much of the Earth out of the Pots as you can without disturbing their Roots, supplying the Place with such fresh Earth as was directed in the Article of *Auricula's*, observing to place the Pots under Shelter to preserve their Buds, which are now forming, from being injur'd by the Cold.

Cover all Pots and Tubs of seedling Flowers in hard Frosts, as also from great Snows: Look out for Snails, and other Vermin, which harbour in old Walls and Hedges, where they may be easily destroy'd before they get abroad.

Prune up *Wilderness-Trees*, and dig up the Ground in the Quarters, which will preserve it from being over-run with noxious Weeds; and in mild Weather, prepare your Ground for such Fibrose-rooted Plants as are to be transplanted the next Month, and provide some Dung to make Hot-beds for sowing annual Plants and Flowers.

Turn over your Heaps of Compost, that the Frost may mellow and break the Clods, and continue to make new Parcels at this Season for a constant Supply.

Plants now in Flower in the open Air.

Winter Aconite, *Helleboraster*, *True Black Hellebore*, some single *Anemonies*, *Early Winter Hyacinth*, *Polyanthus's*, *Primrose*, *Snow-drops*; and, in a warm Situation, the *Round-leav'd Spring Cyclamen*, and *Duke Van Tol Tulip*.

Trees and Shrubs now in Flower.

Laurus-tinus, *Glaftenbury-Thorn*, *Mezerion*, *Clematitis Boxtica*, *Strawberry-Tree*, *Cornelian Cherry*, &c.

Work to be done in the Green-house.

Pick off all wither'd and mouldy Leaves, which by remaining on, corrupt the Air and infect the Plants: You must now carefully guard against Frost, and keep the Heat of your Stoves up to a due Temperature of Warmth: Water now very gently, and always let your Water remain in the Houie, at least, twenty-four Hours before it be us'd: In very damp Weather you should make gentle Fires to dry up the Damps of your Green-house, especially in a great Thaw, for if the cold Vapours are permitted to lodge upon the Plants, it will cause their tender Shoots to rot.

Your *Anana's*, or *Pine-Apples*, which begin to shew their Fruit, must be carefully tended, observing to refresh them often with Water, as also to preserve a due Warmth in the Stove, for if they are neglected at this Season, their Fruit will be poor.

Such Plants as are hardy, and only require to be defended from Frost, should have Air given them constantly, when the Weather is mild, otherwise they will grow mouldy from the Dampness occasion'd by keeping them too close shut up.

Plants in Flower in the Green-house and Stove.

The small and large *Pearl*, *Cushion*, *Hedgehog*, *Tongue*, *Succotrine*, and some other Sorts of *Aloes*; *Double Nasturtium*, *Alaternoides erica folio*, *Persian Cyclamens*; several Sorts of *Ficoides*; some *Geraniums*, *Cbrysanthemums*; *Senecio Africanus folio retuso*, *African Gladiolus*, *Hæmanthus*, with some others.

JASMINUM, [of *ἰαμῖν*, a medicinal Odour, because the Flower of this Plant sending out a sweet Odour is useful in Medicine; of the Hebrew Word *ἰω*, which signifies *Frankincense*.] The *Jasmine*, or *Jessamine-Tree*.

The Characters are;

The Leaves are in many Species pinnated; the Cup of the Flower consists of one Leaf, but is divided at the Top into five Segments; the Flower

Flower consists of one Leaf, is Funnel-shap'd, and divided into five Segments: The Flowers are succeeded by Berries, which split in the Middle, each Side, for the most part, containing a separate Seed.

The Species are;

1. JASMINUM; *vulgatius, flore albo. C. B. P.* The common white Jasmine.
2. JASMINUM; *vulgatius, flore albo, foliis ex luteo elegantissime variegatis.* The common white Jasmine, with yellow strip'd Leaves.
3. JASMINUM; *vulgatius, flore albo foliis ex albo elegantissime variegatis.* The common white Jasmine, with white-strip'd Leaves.
4. JASMINUM; *humile luteum. C. B. P.* Dwarf yellow Jasmine, commonly call'd The Italian yellow Jasmine.
5. JASMINUM; *luteum, vulgò dictum bacciferum. C. B. P.* The common yellow Jasmine.
6. JASMINUM; *humilius, magno flore. C. B. P.* The Spanish white, or Catalonian Jasmine.
7. JASMINUM; *humilius, magno flore pleno.* The double Spanish Jasmine.
8. JASMINUM; *Indicum, flavum, odoratissimum. Fer. Flor.* The yellow Indian Jasmine.
9. JASMINUM; *Azoricum, trifoliatum, flore albo odoratissimum. H. A.* The Three-leav'd Azorian Jasmine, with very sweet white Flowers, commonly call'd The Ivy-leav'd Jasmine.
10. JASMINUM; *Africanum, folio Ilcis, flore solitario, ex alis foliorum proveniente albo. Com. Rar.* African Ilex-leav'd Jasmine, with a single white Flower produc'd from the Wings of the Leaves.
11. JASMINUM; *five Sambach Arabum, Alpini, f. B.* The single Arabian Jasmine.
12. JASMINUM; *Arabicum, foliis Limonii conjugatis, flore albo pleno, odoratissimo. Boerb. Ind.* The double Arabian Jasmine.
13. JASMINUM; *Arabicum, Castanea folio, flore albo, odoratissimo, cujus fructus Coffy in officinis dicuntur nobis. Com. Pl. Us.* The Coffee-Tree.

The first Sort is very common in most English Gardens, being much cultivated for the Sweetness of its Flowers. The second and third Sorts are accidental Varieties from the first, and may be obtain'd by inoculating the Buds of these into the common Jasmine; which, although the Buds should perish, (as it often happens) yet it seldom fails to stain both the Leaves and Branches of the old Plant into which the Buds were put: So that by inoculating some of these Buds into some young Branches in divers Parts of an old Tree, they will not fail to tinge the whole Tree in a short Time.

The common white Jasmine is easily propagated by laying down the tender Branches in the Spring, which, by the succeeding Spring, will be rooted strong enough to be transplanted. They may also be propagated by Cuttings, which should be planted in March, in a moist Border, where they may have the Morning Sun: But they must be skreen'd from the Violence of the Sun in the Heat of the Day, and frequently water'd in dry Weather. The Cuttings thus manag'd, will many

of them live, and have Roots fit to be remov'd in the following Spring: But this Method is seldom practis'd, the Layers always making the best Plants.

When these Plants are remov'd, they should be planted where they are design'd to be continu'd, which should be either against some Wall, Pale, or other Fence where the flexible Branches may be supported: For altho' it is sometimes planted as a Standard, and form'd into a Head, yet it will be very difficult to keep it in any handsome Order; or if you do, you must cut off all the Flowering Branches: For the Flowers are always produc'd at the Extremity of the same Year's Shoots, which, if shortned before the Flowers are blown, will intirely deprive the Trees of Flowers. These Plants should be permitted to grow rude in the Summer, for the Reason before given: Nor should you prune and nail them until the Middle or Latter-end of March, when the frosty Weather is past; for if it should prove sharp frosty Weather after their rude Branches are prun'd off, and the strong ones are expos'd thereto, they are very often destroy'd; and this Plant being very backward in Shooting, there will be no Danger of Hurting them by late Pruning.

The two Strip'd Sorts should be planted in a warm Situation, especially the White Strip'd, for they are much more tender than the Plain, and very subject to be destroy'd by great Frosts, if they are expos'd thereto; therefore it will be proper to preserve a Plant of each Kind in Pots, which may be remov'd into the Green-house in Winter, lest, by exposing 'em to the Cold, they should all be destroy'd, and so you lose the Sorts.

The common Yellow Jasmine was formerly in greater Plenty in England than at present, and was planted against Arbours, &c. to cover them, tho' it is not near so proper for that Purpose as the White Sort, it being of much slower Growth, nor will it ever extend its Branches so far as that; but however, it may have a Place among the Flowering Shrubs of low Growth, where it may be with more Ease reduc'd to a Standard than the other. This Plant flowers in May and June; but they have very little Scent, which has occasion'd its being less regarded. It may be propagated by Suckers, which it generally produces in great Numbers; or by Layers, as was directed for the Common Sort, and be full as hardy.

The Dwarf Yellow Jasmine is somewhat tenderer than the former; yet it will endure the Cold of our ordinary Winters, if it be planted in a warm Situation. The Flowers of this Kind are generally larger than those of the Common Sort, and better-scented, but are seldom produc'd so early in the Season. It may be propagated by laying down the tender Branches, as was directed for the common White Sort; or by Budding or Inarching it upon the common Yellow Jasmine; the latter of which is preferable, as making the Plants hardier than those which are obtain'd from Layers: They should be planted against a

warm

warm Wall; and in very severe Winters will require to be shelter'd with Mats, or some other Covering, otherwise they are subject to be destroy'd. The Manner of Dressing and Pruning being the same as was directed for the White *Jasmine*, I shall not repeat it.

The *Spanish White*, or *Catalonian Jasmine*, is one of the most beautiful of all the Sorts, as also extremely sweet-scented: The Flowers of this Kind are much larger than any of the others, and are commonly of a Red Colour on the Out-side. This Plant is propagated by Budding or Inarching it upon the common White *Jasmine*, on which it takes very well, and is render'd hardier than those which are upon their own Stocks. But those of this Kind being brought over from *Italy* every Spring in so great Plenty, they are seldom rais'd here: I shall therefore proceed to the Management of such Plants as are usually brought into *England* from the Place above-mention'd, which generally are ty'd up in small Bunches containing three or four Plants, and wrapp'd about their Roots with Moss, to preserve them from drying; which, if it happen that the Ship has a long Passage, will often occasion them to push out strong Shoots from their Roots, which must always be taken off before planted, otherwise they will exhaust the whole Nourishment of the Plant, and destroy the Graft.

When you receive these Plants, you must clear the Roots of the Moss, and all decay'd Branches should be taken off; then place their Roots into a Pot or Tub of Water, which should be set in the Green-house, or some other Room, where it may be skreen'd from the Cold: In this Situation they may continue two Days; after which you must prune off all the dry Roots, and plant them into Pots fill'd with fresh light Earth; then plunge the Pots into a moderate Hot-bed of Tanners Bark, observing to water and shade them, as the Heat of the Season may require. In about three Weeks or a Month's Time they will begin to shoot, when you must carefully rub off all such as are produc'd from the Stock below the Graft; and you must now let them have a great Share of Air, by raising the Glasses in the Heat of the Day: and as the Shoots extend, they should be topp'd, to strengthen them, and, by Degrees, should be harden'd to endure the open Air, into which they should be remov'd in *June*: but must have a warm Situation the first Summer; for if they are too much expos'd to the Winds, they will make but indifferent Progress, being render'd somewhat tender by the Hot-bed. If the Summer be warm, and the Trees have succeeded well, they will produce some Flowers in the *Autumn* following, tho' they will be few in Number, and not near so strong as they will be the succeeding Years, when the Trees are stronger, and have better Roots.

These Plants are commonly preserv'd in Green-houses, with *Oranges*, *Myrtles*, &c. and during the Winter-season will require to be frequently water'd, which should be given them sparingly each time, especially in cold

Weather; for too much Wet at that Season will be apt to rot the Fibres of their Roots: They should also have a great Share of free Air when the Weather will permit; for which Purpose they should be plac'd in the coolest Part of the Green-house among Plants that are hardy, where the Windows may be open'd every Day, except in frosty Weather: nor should they be crouded too close among other Plants, which often occasions their growing mouldy, and decays the younger Branches. In *April* the Shoots of these Plants should be shorten'd down to four Eyes, and all the weak Branches should be cut off; and if you have the Conveniency of a Glass-Stove, or a deep Frame, to place the Pots into at that Season, to draw them out again, it will be of great Service in forwarding their Flowering: yet still you should be careful not to force them too much; and as soon as they have made Shoots three or four Inches long, the Glasses should be opened in the Day-time, that the Plants may by degrees be inured to the open Air, into which they should be removed by the latter End of *May*, or the Beginning of *June*, otherwise their Flowers will not be so fair, nor continue so long. If the *Autumn* proves favourable, these Plants will continue to produce fresh Flowers until *Michaelmas*; and sometimes, when they are strong, they will continue Flowering till *Christmas*, or after: but then they must have a great Share of Air when the Weather is mild and will admit of it, otherwise the Flower-Buds will grow mouldy, and decay.

But notwithstanding most People preserve these Plants in Green-houses, yet they will endure the Cold of our ordinary Winters in the open Air, if planted against a warm Wall, and covered with Mats in frosty Weather; they'll also produce ten times as many Flowers in one Season as those kept in Pots, and the Flowers will likewise be much larger: but they should not be planted abroad till they have some Strength; so that it will be necessary to keep 'em in Pots two or three Years, whereby they may be shelter'd from the Frost in Winter: And when they are planted against the Wall, which should be in *May*, that they may take good Root in the Ground before the succeeding Winter, you must turn them out of the Pots, preserving the Earth to their Roots; and having made Holes in the Border where they are to be planted, you should place them therein, with their Stems close to the Wall; then fill up the Holes round their Roots with good fresh rich Earth, and give them some Water, to settle the Ground about them, and nail up their Shoots to the Wall, shortening such of them as are very long, that they may push out new Shoots below, to furnish the Wall, continuing to nail up all the Shoots as they are produc'd. In the middle, or toward the latter end of *July*, they will begin to flower, and continue to produce new Flowers until the Frost prevents them; which, when you observe, you should carefully cut off all the Tops of such Shoots as have Buds form'd upon them, as also those which have the Re-

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mains of faded Flowers left, for if these are suffer'd to remain on, they will soon grow mouldy, especially when the Trees are covered, and thereby infect many of the tender Branches, which will greatly injure the Trees.

Toward the middle of *November* (if the Weather be cold and the Nights frosty) you must begin to cover your Trees with Mats, which should be nail'd over them pretty close; but this should be done when the Trees are perfectly dry, otherwise the Wet being lodg'd upon the Branches, will soon cause a Mouldiness upon them, and the Air being excluded therefrom, will rot them in a short Time; it will also be very necessary to take off these Mats as often as the Weather will permit, to prevent this Mouldiness, and only keep them close cover'd in frosty Weather, at which time you should also lay some Mulch upon the Surface of the Ground about their Roots, and fasten some Bands of Hay about their Stems, to guard them from the Frost, and in very severe Weather, you should add a double or treble Covering of Mats over the Trees, by which Method, if duly executed, you may preserve them through the hardest Winters. In the *Spring*, as the Weather is warmer, so you should by degrees take off the Covering; but you should be careful not to expose them too soon to the open Air, as also to guard them against the Morning Frosts, and dry Easterly Winds, which often reign in *March*, to the no small Destruction of tender Plants, if they are expos'd thereto; nor should you quite remove your Covering until the middle of *April*, when the Season is settled, at which time you should prune the Trees, cutting out all decay'd and weak Branches, shortening the strong ones to about two Feet long, which will cause them to shoot strong, and produce many Flowers.

The Double of this Kind is at present very rare in *England*, and only to be found in some very curious Gardens; though in *Italy* it is pretty common, from whence it is sometimes brought over amongst the Single: The Flowers of this Kind have only two Rows of Leaves, so that it is regarded rather for its Curiosity, than for any extraordinary Beauty in the Flowers: This may be propagated by budding it upon the common White *Jasmine*, as has been directed for the Single, and must be treated in the same Manner.

The Yellow *Indian Jasmine* is propagated either by Seeds, or laying down the tender Branches: If you would propagate them by Seeds, (which they often produce in *England* in great Plenty) you should make a moderate Hot-bed in the *Spring*, into which you should plunge some small Pots, fill'd with fresh light Earth, and in a Day or two after, when you find the Earth in the Pots warm, you must put your Seeds therein, about four in each Pot will be sufficient, covering them about half an Inch thick with the same light Earth, and observe to refresh the Pots with Water as often as you shall perceive the Earth dry; but do not give them too much at each time, which would be apt to rot the Seeds.

In cold Weather, and in the Night, these Beds must be cover'd with Mats over the Glasses; but in warm Weather, the Glasses should be rais'd with Stones, to admit fresh Air, as also to let out the Steam of the Bed. In about five or six Weeks after sowing, the Plants will appear above Ground, at which Time it will be necessary to remove the Pots into another fresh Hot-bed, of a moderate Temperature, in order to bring the Plants forward; you must also be careful to water them as often as necessary, and in the great Heat of the Day the Glasses should be tilted pretty high, and shaded with Mats, to prevent the Plants from being scorch'd with Heat; about the middle of *May* you should begin to harden them to the open Air, by taking off the Glasses when the Weather is warm; but this must be done cautiously, for you should not expose them to the open Sun in a very hot Day at first, which would greatly injure them; but rather take off the Glasses in warm, cloudy Weather at first, or in gentle Showers of Rain, and so by degrees inure them to bear the Sun, and in *June* you should take the Pots out of the Hot-bed, and carry them to some well-shelter'd Situation, where they may remain until the beginning of *October*; at which time they must be carry'd into the Greenhouse, observing to place them where they may enjoy as much free Air as possible when the Windows are open'd, as also to be clear from the Branches of other Plants.

During the Winter-season they will require to be often water'd, but you must be careful not to give them too much at each Time; and in *March* you must remove these Plants each into a separate Pot, being careful not to take the Earth from their Roots, and if at this time you plunge them into a fresh moderate Hot-bed, it will greatly facilitate their rooting again, and be of great Service to the Plants; but when you perceive they are rooted, you must give them a great deal of Air; for if you draw them too much, they will become weak in their Stems, and incapable to support their Heads, which is a great Defect in these Trees.

You must also harden them to the open Air, into which they should be remov'd about the middle of *May*, observing, as was before directed, to place them in a Situation that is defended from strong Winds, which are injurious to these Plants, especially while they are young. In Winter house them, as before, and continue the same Care, with which they will thrive very fast, and produce annually great Quantities of Flowers.

These Plants are pretty hardy, and will require no other Care in Winter than only to defend them from hard Frosts; nor do I know whether they would not live in the open Air, if planted against a warm Wall, which is what I am this Year [1730.] trying, for I have planted some against a Wall for that Purpose, and I think we have little Reason to doubt of the Success, since they are much hardier than the *Spanish*; but there is this Difference between them, *viz.* these Plants have large, thick,

thick, ever-green Leaves, so that if they were cover'd with Mats, as was directed for the *Spanish Jasmine*, the Leaves would rot and decay the Shoots; but as these will only require to be cover'd in extreme Frost, so, if their Roots are well mulch'd, and a Mat or two loosely hung over them in ordinary Frosts, it will be sufficient, and these Mats being either roll'd up, or taken quite off in the Day, there will be no great Danger of their being hurt, which only can proceed from being too long close cover'd.

In the *Spring* these should be prun'd, when you should cut off all decay'd Branches; but you must not shorten any of the other Branches, as was directed for the *Spanish Sort*, for the Flowers of this Kind are produc'd only at the Extremity of the Branches, which, if shorten'd, they would be cut off, and this growing of a more ligneous Substance in the Branches than the other, will not produce Shoots strong enough to flower the same Year.

If you would propagate this Plant from Layers, the Shoots should be laid down in *March*; and if you give them a little Cut at the Joint (as is practis'd in laying of *Carnations*) it will promote their Rooting: You should also observe to refresh them often with Water when the Weather is dry; which, if carefully attended to, the Plants will be rooted by the succeeding *Spring* fit to be transplanted, when they must be planted in Pots fill'd with light Earth, and manag'd as was before directed for the Seedling Plants.

The *Azorian Jasmine* is also pretty hardy, and requires no more Shelter than only from hard Frosts; and I am apt to think, if this Sort was planted against a warm Wall, and manag'd as hath been directed for the *Yellow Indian Jasmine*, it would succeed very well; for I remember to have seen some Plants of this Kind growing against a Wall in the Gardens at *Hampton-Court*, where they had endur'd the Winter, and were in a more flourishing State than ever I saw any of the kind in Pots, and produc'd a greater Quantity of Flowers. These Plants are propagated in the same manner as the *yellow Indian*, and require the same Management. The Flowers of this Kind are small, but being produc'd in large Bunches, do make a handsome Figure, and are of a very agreeable Scent, and the Leaves being large and of a shining green Colour, add to the Beauty of the Plant very much.

The *Ilex-leav'd Jasmine* affords the least Pleasure of any of the Kinds of *Jasmines*, the Flowers being only produc'd singly from the Wings of the Leaves, and are very small; the Leaves also are of a pale Green, and the Plant naturally growing very ragged, has occasion'd its being but little valu'd; however, it should not be wanting in good Collections of Plants, for though the Flowers are small and produc'd singly, yet it continues flowering most part of the Year. This Plant is propagated by planting Cuttings in any of the Summer-months, which should be put into Pots fill'd with light sandy Earth, and plung'd into a Hot-bed, observing to water and shade them as the Season

may require. When these are rooted, (which will be in about five or six Weeks time) they may be remov'd into separate Pots; and when they have taken fresh Root, they may be remov'd into a Situation where they may be defended from strong Winds, in which Place they may remain until the middle of *October*; at which time they must be hous'd with *Geraniums*, &c. observing to water them frequently, and give them as much free Air as possible, when the Weather is mild and will permit; for if they are too much drawn in Winter, their tender Shoots will be subject to grow mouldy and rot. These Plants should be often renew'd by planting Cuttings, for the old ones are very subject to decay.

The *Arabian Jasmines* of both Sorts are commonly brought into *England* from *Genoa* every *Spring* amongst the *Spanish Jasmines*. These are all grafted upon the common *Jasmine Stock*, as are the *Spanish*; but being much tenderer than those, are very often greatly injur'd in their Passage, (which is always in the Winter-season) so that you should carefully examine them (when you purchase them of the *Italians*, who bring them over) to see if their Grafts are fresh and sound; if so, there is little Danger of succeeding. These must be put into Water and wash'd, pruning their Roots and Branches, and planting them, as was directed for the *Spanish Jasmines*, to which I shall refer the Reader to avoid Repetition.

These Plants are more tender than any of the Sorts before-mention'd, and must be preserv'd in a warm Stove in Winter, nor should they be expos'd to the open Air in Summer, if you would have them flower well, (though indeed the Plants will live and thrive in the open Air in *June*, *July* and *August*) but then they will rarely produce any Flowers; and those which may appear, are soon destroy'd by either Winds or Rain, both which will soon scatter them, being but slenderly fasten'd upon the Plants. The only Method in which I have found these Plants to thrive and flower well, is this, *viz.* After having preserved the Plants in a moderate Stove all the Winter, I clean'd their Leaves and Stems from Dust; then I took out the Earth from the upper part of the Pots, and refill'd them with fresh Earth; then I plunged the Pots into a moderate Bed of Tanners Bark, which had lost most of its Heat: This occasion'd the Plants to shoot very strong, and in *June* and *July* I had great Quantities of Flowers, which were exceeding sweet, but of a short Duration, seldom continuing longer than two Days: however, these were succeeded by fresh Flowers through the greatest Part of *June* and *July*, during which Time my Plants were never entirely destitute of Flowers.

These *Jasmines* may also be propagated by laying down their tender Branches in the *Spring*, in the same Manner as was directed for the *yellow Indian Jasmines*, which will take Root in less than three Months, provided the Pots are plung'd into a Hot-bed, otherwise they will not be rooted until the succeeding *Spring*.

Spring. These must be planted into a light sandy Earth, and frequently watered in hot Weather; but during the Winter-season, it must be given them but sparingly, for too much Moisture at that time will destroy them.

The Sort with double Flowers, which we have now in *England*, has rarely more than two Rows of Leaves, (as I observed in the *Spanish*) so that it is but little better than the single: But there is another Sort of this *Jasmine*, which was formerly in *England*, and is now in the Duke of *Tuscany's* Gardens at *Pisa*, which produces Flowers almost as large as a *Cinnamon Rose*, and as double, as also of a most inoffensive sweet Scent; but this is not in *England* at present, nor is it likely to be obtain'd here, since it is not known to be growing in any other Part of *Europe* but the Garden at *Pisa*, where it is kept under a Guard to prevent its being stolen away: Such is the narrow Temper of the present Possessor, that he will not suffer it to be distributed into any other Gardens; though the Professor of Botany to that Garden says, it encreases greatly by Layers, by which means all *Europe* might be soon supply'd with this valuable Plant, were it but once in the Possession of any communicative Person.

The *Coffee-Tree* is propagated by Seeds, which should be sown soon after they are gather'd from the Tree; for if they are kept but a short time out of the Ground, they will not grow, which is the chief Reason that this Tree has not been spread into more different Countries: for the Seeds will not keep good long enough to be sent to any distant Place; so that in order to cultivate this Plant in any part of the World, it is absolutely necessary to have it carry'd thither growing: But as this Difficulty is now overcome, by the Quantity of these Trees there are now growing both in *Europe* and *America*, so we may expect to be furnish'd with them from many different Parts, but especially from the *Caribbe Islands*, where the Trees are found to succeed as well as in their native Place of Growth; but whether the *Coffee* produc'd in the *West-Indies* will prove as good as that brought from *Mocha*, Time will discover: But if it should, it may be of great Advantage not only to the Inhabitants there, but also may turn to great Account in the *West-India Trade*. The manner how this Tree was first brought into *Europe*, and the several Parts of the World to which it is now spread, may be fully seen in Doctor *Douglas's* curious Account of the *Coffee*, published at *London Anno 1727*.

The Berries of this Plant are commonly ripe with us in *April*; at which time they should be sown in Pots of fresh light Earth, covering them about half an Inch thick with the same light Earth; then plunge the Pots into a moderate Hot-bed of *Tanner's Bark*, observing to refresh them often with Water; as also to raise the Glasses in the Heat of the Day, to admit fresh Air; and in very hot Weather it will be proper to shade the Glasses with Mats, for otherwise the Earth in the Pots will dry too fast, and prevent the Vegetation of the Seeds.

I must here observe, that the taking off the Pulp of the Berries, which has been by some People directed as absolutely necessary before they are planted, is a great Mistake; for I have experienced that those Berries which were planted whole as they came from the Tree, produc'd stronger Plants, and came up sooner than those which were clear'd from the Pulp; and although they are commonly two Seeds in each Berry, (both which seldom fail to grow) yet when the Plants are young, they are easily parted and planted into separate Pots; which is absolutely necessary to be done when they are about an Inch and an half high. When these Plants are removed, great Care should be taken not to break or injure their Roots, as also to preserve the Earth to their Roots; nor should they be kept any Time out of the Ground; for if their Fibres are suffer'd to dry, they are very subject to mould, and perish soon after.

The Soil in which I have found these Plants to thrive best, was compos'd in the following Manner; viz. one Load of fresh light Earth, one Load of rotten Cow-Dung, with half a Load of Sea-Sand: These were well mix'd together, and laid in a Heap six Months before it was used; in which Space it was turned several times, the better to incorporate the several Parts.

It must also be observ'd, that in transplanting these Plants, they should never be put into Pots too large, in which they seldom thrive: The young Plants, when taken out of the Pots in which they were sown, should be planted each into a small half-penny Pot fill'd with the above-mention'd Earth, and then plung'd into a moderate Hot-bed of *Tanner's Bark*, observing to water them frequently, though they should not have too much given them at one Time: The Glasses should also be rais'd to admit fresh Air every Day, and in the Heat of the Day should be shaded with Mats; for if they are too much expos'd to the Sun, they will perspire so freely, as to have little Moisture remaining in their Leaves, whereby they will hang and appear very sickly, as will also the tender Shoots, by which their Growth will be greatly retarded. As these Plants advance in Height, so should they have a greater Proportion of fresh Air at all times when the Weather is warm, and their Waterings should be frequently repeated; tho' it must be perform'd with great Moderation, for too much Moisture is very subject to rot the Roots; and when once the Roots are decay'd, it seldom happens that those Plants are ever recovered, tho' managed with all possible Skill and Care.

During the Winter-season these Plants should be plac'd in a Bark-stove, that the Fibres of the Roots may not be too much dry'd, (which often happens when the Pots are plac'd upon Shelves in a dry Stove) whereby the Top-shoots of the Plants are often decay'd, and the Leaves are apt to turn brown and fall off, which is of very ill Consequence to them; for if once the Leaves fall intirely off, the Plants are seldom recovered again so as to be beautiful.

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This Stove should be kept up to the temperate Heat, (mark'd on Mr. *Fowler's* Thermometers) with which they thrive better than in a great Warmth; for if they are kept over hot, they perspire too freely, so that their Leaves will droop and change their Colour. In this Season they should be water'd frequently, but it must be given them sparingly, and the Water should always be plac'd in the Stove twenty-four Hours before it be used, that it may acquire a Warmth nearly equal to the Temperature of the Air in the Stove.

You must also clean their Leaves frequently from Filth, which they are subject to contract when shut up close; as also many small Insects are harbour'd upon the Surfaces of the Leaves, which, if not carefully clean'd off, will greatly injure the Plants. The best Method to clean off these is, with a soft Woollen Cloth dip't in Water, with which you may easily wash them off; but you should be careful not to bruise their Leaves, nor to wet them too much, especially in the Depth of Winter.

You should also be careful in placing them in the Stove, not to set them under the Branches of other Plants, nor too close to them, whereby their Branches may intangle therewith, which will cause them to shed their Leaves, or at least occasion their discolouring; and in the Spring, when their Blossoms begin to appear, they must be more frequently water'd, as also their Leaves and Branches often clean'd, which will cause their Leaves to look of a beautiful Green, and their Flowers to be strong, and their Fruit will set the better.

In the Summer they must be continu'd in the Stove, with their Pots plung'd in Bark, (which should not be too hot) but they must have a great Share of fresh Air in warm Weather, and the Glasses should be shaded in the Heat of the Day, for they do not care to be too much expos'd to the direct Rays of the Sun, which occasions their tender Shoots and Leaves to flag and hang down, and thereby retards the Growth of the Plants: You must also observe to shift them into fresh Earth whenever you find their Roots to shoot through the Holes at the Bottom of the Pots; but this will scarce happen oftener than twice a Year, so that I would advise the shifting them in *May*, and the beginning of *August*, which are the properest Seasons for this Work; but in the doing of it, you should be careful to preserve the Earth to their Roots, and only to pare off the Outside of the Ball, cutting away all mouldy or decay'd Fibres; then put them into Pots, one Size bigger than those which they came out of, filling up the Pots with the before-mention'd Earth, observing to water and shade them, as the Heat of the Weather shall require: And if at these Times you mix a little new Bark in the Bed to add a fresh Heat thereto, before the Pots are plung'd therein, it will greatly facilitate their rooting again, but you must be careful not to make the Bed too hot: You should also, in Summer-time, refresh all the Branches and Leaves of the Trees, by watering them gently with a fine headed Watering-pot all over their Heads;

and if in a very warm, gentle Shower of Rain, you draw off the Top-glasses of the Stove, and let them receive the Benefit thereof, it will be of great Service to them: but you must be careful not to expose them to hard Rains, or strong Winds, which would prove very hurtful to them.

These Directions, if carefully attended to, will be found sufficient to instruct any Person in the Culture of this beautiful Plant; and although there may, perhaps, something occur to them which is not here related, yet I believe it will rarely happen, but that the Appearances, be they from what Cause soever, may be found owing to some Neglect or contrary Practice to this here mentioned: But before I leave this Head, I cannot help mentioning another Method in which I have propagated this Plant; which is, by laying down some of their tender Shoots into Pots of Earth in the Spring of the Year, slitting them at a Joint, (as is practis'd in laying *Carnations*) observing to refresh them frequently with Water, and in about three Months time they will be rooted enough to transplant, when they should be gently cut from the old Plant, and planted into separate Pots, managing them as was directed for the Seedling Plants.

There are some who have asserted, that this Plant will grow from Cuttings; but of all the different Trials which I have made, I could never obtain one Plant that way, tho' many times the Cuttings have remained fresh for several Months, and sometimes have made small Shoots, yet upon taking them up, they have not had the least Appearance of any Roots.

IBERIS, or *SCIATICA-CRESS*; *vide* *Lepidium*.

IBISCUS, or *MARSH-MALLOW*; *vide* *Althæa*.

ICE is a hard, transparent Body, formed from some Liquor congealed or fixed.

Ice is said to be the natural State of Water, which remains firm and not liquid, when no external Cause acts upon it.

The true Cause of the Congelation of Water into *Ice*, seems to be the Introduction of frigorifick Particles into the Pores or Interstices between the Particles of Water; and by that means getting so near them, as to be just within the Spheres of one another's Attractions, and then they must cohere into one solid or firm Body.

It may be wondered why *Ice* goes to the Top of the Water; for one would imagine, that being colder than flowing Water, it ought to be more condensed, and consequently heavier: But it is to be considered, that there are always some Bubbles of Air interspers'd in *Ice*. It is certain, by the swimming of *Ice* upon Water, that it is specifically lighter than the Water out of which it is made by freezing: And it is as certain, that this Lightness of *Ice* proceeds from those numerous Bubbles that are produc'd in it by Congelation.

Water, when it is frozen into *Ice*, takes up more Space than it did before it was congeal'd.

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It is visible, that the Dimensions of Water are increas'd by freezing, its Particles being kept at some Distance the one from the other, by the Intervention of the frigorifick Matter.

And besides, there are many little Volumes of Air included at several Distances, both in the Pores of the watery Particles, and in the Interstices made by the Spherical Figures. Now by the Insinuation of these Crystals, the Volumes of Air are driven out of the watery Particles, and many of them uniting, form larger Volumes; these have thereby a greater Force to expand themselves than when they are dispersed, and so both enlarge their Dimensions, and lessen the specifick Gravity of Water thus congealed into *Ice*.

It seems very probable, that Cold, and Freezing, and consequently *Ice*, are produced by some Substance of a saline Nature floating in the Air; in that Salts, and more eminently some particular ones, when mixed with *Ice* or *Snow*, do wonderfully increase the Force and Effects of Cold.

It is also visible, that all saline Bodies do cause a Stiffness and Frigidity in those Bodies into which they enter.

It is manifest by observing Salts by Microscopes, that the Figures of some Salts, before they shoot into Masses, are then double wedge-like Particles, which have abundance of Surface in respect to their Solidity; and this is the Reason why they swim in Water, when once they are raised in it, altho' they are specifically heavier: These small Points of Salts getting into the Pores of the Water, whereby they are in some measure suspended in the Water, when the Heat of the Sun is not ordinarily strong enough to dissolve the Salts into a Fluid, to break their Points, and to keep them in perpetual Motion, which being less disturb'd are more at Liberty to approach one another; and by shooting into Crystals, of the Form above-mentioned, do, by their Extremities, insinuate themselves into the Pores of Water, and by that means freeze it into a solid Form call'd *Ice*.

As to Thawing, the Reason seems to be, that Heat afterwards separating them, and putting those saline or frigorifick Particles into Motion, breaks this Union, and separates the Particles so far from one another, that they get out of the Distance of the attracting Force, and into the Verge of the repelling Force, and then the Water resumes its fluid Form.

Monf. Mariotte, in his Treatise of *Hydrostaticks*, gives the subsequent Account of what happens to Water in freezing, which he discover'd by the following Experiment.

Having filled a cylindrick Vessel of about seven or eight Inches high, and six Inches diameter, within two Inches of the Top with cold Water, he expos'd it to the open Air in a great Frost, and observed exactly the whole Progress of the freezing of it.

The first Congelation was in the upper Surface of the Water, in little long Water-Shoots or Laminæ, which were jagged like a Saw, the Water between them remaining still unfrozen, though the rest of the Surface was already frozen to the Thickness of more than

two Lines, he observed that several Bubbles of Air were formed in the *Ice*, that began to fix on the Bottom and Sides of the Vessel, some would rise up, and others remained intangled in the *Ice*, which made him imagine that these Bubbles taking up more Space in the Water than when their Matter was, as it were, dissolved in it, they pushed up a little Water through the Hole at the Top, after the same manner that new Wine works out at the Bung-hole of a Vessel when it begins to heat; and the little Water that ouzed out at this little Hole in the *Ice*, spreading itself upon the upper Surface of the Water, which was already frozen, became *Ice* also, and there began to form a Hill of *Ice*; and that Hole continuing open, by reason of the Water which passed successively through it, being pushed up by the new Bubbles which formed themselves in the *Ice*, which continued to increase about the Sides and Bottom of the Vessel; he observed that the upper Surface of the Water was frozen above an Inch thick towards the Edges of the Vessel, and above an Inch and half round about the little Hole, before the Water that was contained in it, as in a Pipe, became frozen; but at last it was frozen: Then the middle of the Water remaining unfrozen, and the Water which was compressed by the new Bubbles, which formed themselves for two or three Hours, having no Vent at the little Hole, the *Ice* broke at once towards the Top, by the Spring of the included Air.

He try'd the Experiment a second Time, and when the *Ice* was about two Inches thick, he warmed the Sides of the Vessel to melt the Outside of the *Ice*, and by that means drew it whole out of the Vessel, without spilling the Water that was contained in the middle of the *Ice*; then exposing this *Ice* to the open Air, that the rest of the Water might freeze, it broke three or four Hours after, and he found a Cell in the middle of about one Inch and a half Diameter, containing the Water that remained still unfrozen, which ran out upon the breaking of the *Ice*.

He made the Experiment the third Time, and having taken out the *Ice* as before, with a large Pin he made a Hole in the *Ice*, over the little Pipe or Channel above-mention'd, where the *Ice* was an Inch higher than any where else, by reason of the Water which had ouzed out at the little Hole, and was there frozen, and as soon as he drew out the Pin, some Water spouted out at the Hole, and then the Hole was frozen up again; still as the Hole was frozen up he pricked the *Ice*, till all the Water was frozen, then he expos'd that Lump of *Ice* to the Air for a whole Night without its breaking; which plainly shew'd, that in the foregoing Experiments the Spring of the Air-bubbles was the only Reason of the breaking of the *Ice*.

The Middle of the frozen Lump had about as much Air in it as *Ice*; but there were but few Bubbles towards the Outside, in Proportion to the *Ice*.

If by boiling the Water you drive the Aerial Matter out of it, before you set it out

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to freeze, you will have *Ice* two or three Inches thick, without any visible Bubbles, and so transparent, as to be as fit to burn by the Sun's Rays, as Convex Glasses do.

JET D'EAU, is a *French* Word, which signifies a Fountain that casts up Water to any considerable Height in the Air.

Mr. *Mariotte* in his Treatise of *Hydrostaticks* says, That a *Jet d'eau* will never rise so high as its Reservatory; but always falls short of it by a Space which is in a subduplicate Ratio of that Height, and this he proves by several Experiments. That tho' *Jets* ought to rise to the Height of the Reservatories, yet the Friction of the Sides of the Ajutages, and the Resistance of the Air, are the Causes that in *Jets* that have very high Reservatories, the Height of the *Jets* does not come up to that of the Reservatory by a great deal.

He adds, that if a greater branches out in many smaller ones, or is distributed through several *Jets*, the Square of the Diameter of the main Pipe must be proportion'd to the Sum of all the Expences of its Branches: That if the Reservatory be 32 Feet high, and the Ajutage half an Inch in Diameter, the Pipe ought to be three Inches in Diameter.

He says, That the Beauty of *Jets* of Water consists in their Uniformity and Transparency at the going out of the Ajutage, and spreading but very little, and that to the highest Part of the *Jet*.

That the worst sort of Ajutages are those that are Cylindrical; for they retard very much the Height of the *Jets*; the Conick retard it less: But the best way is to bore the Horizontal Plane, which shuts the Extremity of the Pipe or Conduit, with a smooth and polish'd Hole; taking Care that the Plate be perfectly plain, polish'd and uniform.

ILEX [takes its Name of אֵילֵךְ *Heb.* an Oak, because this Tree is a Species of Oak] The Ever-green Oak.

The Characters are;

The Leaves are for the most part indented or sinuated, (and in some the Edges of the Leaves are prickly) and are Ever-green; it hath amaranthaceous Flowers, which are produced at remote Distances from the Fruit, on the same Tree; the Fruit is an Acorn like the common Oak.

The Species are;

1. **ILEX**; *folio angusto non serrato.* C. B. P. The Olive-leav'd Ever-green Oak.

2. **ILEX**; *folio oblongo serrato.* C. B. P. Narrow-leav'd Ever-green Oak, with serrated Leaves.

3. **ILEX**; *folio Agrifolii.* Bot. Monsp. Holly-leav'd Ever-green Oak.

4. **ILEX**; *folio rotundiore molli, modiceque sinuato sive smilax Theophrasti.* C. B. P. The Ever-green Oak, with round, smooth, sinuated Leaves.

5. **ILEX**; *aculeata cocciglandifera.* C. B. P.

There are several other Varieties of these Trees, which differ in the Shape of their Leaves, some being long and smooth, others are rounder, and have many Prickles upon

their Edges, and some have their Leaves sinuated and waved like those of the *Holly*; but as these are only seminal Variations, and will arise from Seeds taken from the same Tree, so it is not worth troubling myself or the Reader, to enumerate their several Distinctions in this Place, since those above-mentioned are the most common Varieties, and all the other Differences will be nearly allied to one or other of the four first Sorts.

These Trees are propagated by sowing their Seeds; the best Season for this Work is in the beginning of *March*; but then, as the Acorns are ripe in *Autumn*, they should be preserv'd either in Sand or dry Earth until the *Spring*, otherwise they will lose their growing Faculty, which is commonly the Case with those brought annually from *Genoa*, scarce one Seed in fifty of them ever rising; however, since we have many large Trees now in *England* which produce good Seeds, we need not send to *Italy* for them; but were I to advise, I should much rather have them from *Portugal* than *Italy*; for the Voyage being much shorter, they are generally brought from thence in very good Condition.

The Manner in which I would advise their being sown, is, if for large Quantities, in Drills at about two Feet Distance; but for a small Parcel, they must be sown in Rows on a Bed much nearer.

The Ground on which these Seeds are sown, should be well dug and cleansed from the Roots of all noxious Weeds, &c. and levell'd even, and the great Clods broken, then draw the Rills with a Hoe in a strait Line (as is practis'd in the sowing of *Kidney-beans*) about two Inches deep, laying the Acorns therein two or three Inches asunder, then draw the Earth over them with the Head of a Rake, observing that none of them are left uncovered, which would intice the Vermin to attack your Acorns, especially the Mice, whereby your Seminary will be greatly injur'd, if not wholly destroy'd.

In the middle of *April* the young Plants will appear above Ground, you must then clear the Ground from Weeds, which would soon overspread and destroy the Plants, which must constantly be observ'd, especially while they are young. The first Year from Seed they will make but small Progress, but afterwards they will make amends by their quick Growth (especially if they agree with the Soil) in *March* following you must gently dig up the Ground between the Rows of Plants, in order to destroy the Weeds, and to render it light for the Roots to strike out on each Side, which will greatly promote the Growth of the Plants; but in doing of this you should be very careful not to disturb the Roots of the Plants, which would greatly injure them: In this Place they may remain until the second Spring after sowing, when, in the beginning of *April*, you should take up the Plants where they are too close, and transplant them where they are design'd to remain: But as these Trees are subject to have Tap-Roots, so they are very difficult to be remov'd; you must there-

therefore observe to take them up with a good Ball of Earth to their Roots, and carry them immediately to the Places where they are to be planted, placing them into Holes which should be well prepar'd before, and if the Weather be dry, you should pour a good Quantity of Water into the Holes, making the Earth like Pap, then placing the Plants therein, you should fill up the Holes about their Roots with the like pappy Earth, and then lay some Mulch upon the Surface of the Ground round their Roots, and give them some Water to settle the Earth to their Roots, and if the Season should continue dry, you must repeat watering them once a Week, which Water should be poured all over the Heads of the Plants, but by no means give them too much, which, as I have already said, destroys more new-planted Trees than any other Accident whatever.

But in taking up these Plants from the Seminary, you should be careful not to injure the Roots of those left remaining, nor must the Ground about their Roots remain long open, but so soon as you have taken up those that are to be transplanted, the whole Ground should be slightly dug and levell'd even: The Distance these Plants should be left in the Rows where they were sown, ought to be two Feet, which will allow them Room enough to grow three or four Years longer, at which Time they must be transplanted, (especially all such as are not design'd to remain for good) but you should the precedent Spring dig near the Roots of those which are to be remov'd, and cut underneath them with your Spade, to take off the Tap-Roots; but you must observe not to cut them too close to the Plants, lest you destroy them; this will occasion their pushing out many Fibres, whereby the Earth will be better preserv'd to their Roots when they are transplanted, and there will be less Danger of their not growing.

It has been directed by most People who have written on these Trees, to sow the Acorns in Pots, and when the Plants have grown two or three Years therein, to shake them out of the Pots, preserving all the Earth about them, and to plant them where they are to remain, which is a very good Method for small Quantities; but the Trouble of this in large Plantations would be too great, especially if we consider that these Plants, while in Pots, will require constantly to be water'd in dry Weather, otherwise they will be subject to fail, or at least will make but poor Progress; and although it is generally thought very hazardous to remove these Trees, yet I believe, if great Care be taken, first, to observe the just Season, which is in the beginning of *April*; secondly, to preserve as much Earth to their Roots as possible; and, thirdly, not to keep them long above Ground, the removing of these Trees will not be found so dangerous as most People imagine.

And I am convinc'd, that Trees of seven or eight Years Growth, are in less Danger of suffering by Transplantation, than those that

are much younger; for in the Year 1727, I remov'd many of these Trees which were five or six Feet high, and though they had not been so well manag'd in the Place where they were rais'd, as might be wish'd, yet but one of the whole Number fail'd, notwithstanding the Season prov'd dry for near a Month after.

These Trees are by many People greatly esteem'd for Hedges, to surround Wildernets Quarters; but they are subject to grow too large for that Purpose, because we should never hide the Tops of the Trees in such Places from the Sight, for they are, if rightly dispos'd in the Quarters, vastly more agreeable to the Eye than the finest shear'd Hedge in the World; but they may do well enough for a large Fence to obstruct the Sight, or to defend a new Plantation of tender Trees, for which Purpose the Acorns should be sown in the Place where the Hedge is design'd, and when the Plants are come up, they should be thinned where they are too close, and if the Ground is kept clear from Weeds, and every Spring dug about the Plants, they will soon form a good Hedge; but you should observe not to let them grow too much in Height, before the bottom part of the Hedge is well strengthen'd, which would occasion its bending, and the Branches would be subject to be displac'd with strong Winds or great Snows, and thereby become very unsightly; but if they are regularly train'd up, they will make a good thick Hedge from the Ground to the Height of forty Feet, and that in less Time than any other Tree whatever.

The Soil in which these Trees thrive best, is a hazelly Loam, not too strong nor over light, in which they will grow to a large Size, and resist the severest Cold of our Climate, and retaining their Leaves all the Winter, do afford an agreeable Prospect in that Season; but they should by no means be planted near such Walks or other Parts of the Garden, as are intended to be kept clean; for in the Month of *April*, when they cast their old Leaves, they make a great Litter, and are apt to blow about with the Wind, and become very troublesome, and in *June*, when their Male Flowers fall off, they occasion no less Trouble to clean them up daily in such Places; and in the pleasantest Season of the Year they are the most unsightly Trees in a Garden, the old Leaves decaying at that Season and falling off, and the Male Flowers, which are generally in great Plenty, are then produc'd, which renders it not so valuable in Places much frequented; but for larger Plantations, at a remote Distance from the Habitation, so as to be just within the View, they make a very handsome Appearance, especially in the Winter-season.

The Wood of this Tree is accounted very good for many sorts of Tools and Utensils, as Mallet-Heads, Mall-Balls, Chairs, Wedges, Beetles, Pins, &c. as also for Pallisado's, and affords the most durable Charcoal in the World, and is the common Fuel in the Southern Parts of *France* and *Italy*.

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The *Kermes* or *Holm-Oak* is of a much lower Stature than the former Sorts, and seldom grows to the Height of a Tree: This, tho' a Native of the warmest Parts of *France*, yet will endure the Cold of our Climate in the open Air. It may be propagated in the same manner as the former, and deserves a Place amongst other Shrubs of low Growth, for its Curiosity, as being the Plant upon which the *Kermes* are bred; the History of which may be seen at large in *Garidel's History of the Plants which grow in Provence*, it being too long to be inserted here.

INARCHING, is a Method of *Grafting*, which is commonly call'd *Grafting by Approach*. This Method of *Grafting* is us'd, when the Stock you intend to graft on, and the Tree from which you would take the Graft, stand so near, (or can be brought so near) that they may be join'd together. The Method of performing it is as follows: Take the Branch you would inarch, and having fitted it to that Part of the Stock where you intend to join it, pare away the Rind and Wood on one Side about three Inches in Length. After the same manner cut the Stock or Branch in the Place where the Graft is to be united, so that they may join equally together, that the Sap may meet; then cut a little Tongue upwards in the Graft, and make a Notch in the Stock to admit it; so that when they are join'd, the Tongue will prevent their slipping, and the Graft will more closely unite with the Stock. Having thus plac'd them exactly together, you must tie them with some Bafs, or other soft Tying; then cover the Place with Grafting Clay, to prevent the Air from entering to dry the Wound, or the Wet from getting in to rot the Stock: you should also fix a Stake into the Ground to which that Part of the Stock, as also the Graft, should be fasten'd, to prevent the Wind from breaking them asunder, which is often the Case, when this Precaution is not observ'd.

In this manner they are to remain about four Months, in which Time they will be sufficiently united; and the Graft may then be cut from the Mother-Tree, observing to slope it off close to the Stock: And if at this time you cover the join'd Parts with fresh Grafting Clay, it will be of great Service to the Graft.

This Operation is always perform'd in *April* or *May*, that the Graft may unite with the Stock before the succeeding Winter, and is commonly practis'd upon *Oranges*, *Myrtles*, *Jasmines*, *Wall-Nuts*, *Firs*, *Pines*, and several other Trees, which will not succeed by common Grafting or Budding. But altho' I have mention'd *Orange-Trees* amongst the rest, yet I would by no means advise this Practice where the Trees are design'd to grow large, which, in this Method, they rarely ever will do; and it is chiefly practis'd upon those Trees only as a Curiosity, to have a young Plant with Fruit upon it, in a Year or two from Seed, by inarching a bearing Branch into a young Stock, whereby it is effected: yet these Plants are seldom long-liv'd.

INDIGO; *vide* Anil.

INOCULATING, or Budding: This is commonly practis'd upon all Sorts of Stone Fruit; in particular, such as *Peaches*, *Nectarines*, *Cherries*, *Plums*, &c. as also upon *Oranges* and *Jasmines*, and is preferable to any Sort of Grafting for most Sorts of Fruit. The Method of performing it is as follows: You must be provided with a sharp Pen-knife, having a flat Haft, (the Use of which is to raise the Bark of the Stock, to admit the Bud) and some sound Bafs-mat, which should be soak'd in Water, to increase its Strength, and make it more pliable; then having taken off the Cuttings from the Trees you would propagate, you should chuse a smooth Part of the Stock about five or six Inches above the Surface of the Ground, if design'd for Dwarfs; but if for Standards, they should be budded six Feet above Ground: Then with your Knife make an Horizontal Cut cross the Rind of the Stock, and from the Middle of that Cut make a Slit downwards about two Inches in Length, so that it may be in the Form of a T: but you must be careful not to cut too deep, lest you wound the Stock: Then having cut off the Leaf from the Bud, leaving the Foot-stalk remaining, you should make a cross Cut about half an Inch below the Eye, and with your Knife slit off the Bud, with part of the Wood to it, in Form of an Escutcheon: This done, you must with your Knife pull off that Part of the Wood which was taken with the Bud, observing whether the Eye of the Bud be left to it, or not; (for all those Buds which lose their Eyes in stripping, should be thrown away, being good for nothing): Then having gently rais'd the Bark of the Stock with the flat Haft of your Pen-knife clear to the Wood, you should thrust the Bud therein, observing to place it smooth between the Rind and the Wood of the Stock, cutting off any part of the Rind belonging to the Bud, which may be too long for the Slit made in the Stock, and so having exactly fitted the Bud to the Stock, you must tie them closely round with Bafs-mat, beginning at the Under-part of the Slit, and so proceed to the Top, taking Care that you do not bind round the Eye of the Bud, which should be left open.

When your Buds have been inoculated three Weeks or a Month, you will see which of them are taken; those of them which appear shrivell'd and black, being dead; but those which remain fresh and plump, you may depend, are join'd: And at this Time you should loosen the Bandage, which, if not done in Time, will pinch the Stock, and greatly injure, if not destroy, the Bud.

The *March* following you must cut off the Stock about three Inches above the Bud, sloping it, that the Wet may pass off, and not enter the Stock: To this Part of the Stock left above the Bud, it is very proper to fasten the Shoot which proceeds from the Bud, and would be in danger of being blown out, if not prevented: but this must continue on no longer

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longer than one Year, after which it must be cut off close above the Bud, that the Stock may be cover'd thereby.

The Time for *Inoculating* is from the middle of *June* until the middle of *August*, according to the Forwardness of the Season, and the particular Sorts of Trees, which may be easily known, by trying the Buds whether they will come off well from the Wood. But the most general Rule is, when you observe the Buds form'd at the Extremity of the same Year's Shoots, which is a Sign of their having finish'd their Spring Growth.

The first Sort commonly inoculated is the *Apricock*; and the last the *Orange-Tree*, which should never be done until the middle of *August*. And in doing of this Work you should always make Choice of Cloudy Weather: for if it be done in the middle of the Day in very hot Weather, the Shoots will perspire so fast, as to leave the Buds destitute of Moisture. Nor should you take off the Cuttings from the Trees long before they are us'd: But if you are oblig'd to fetch your Cuttings from some Distance, as it often happens, you should then be provided with a Tin Instrument, having a Socket about ten Inches long, and a Cover to the Top, which must have five or six Holes; in this Socket you should put as much Water as will fill it about two or three Inches high, and place your Cuttings therein in an upright Position, so that That Part which was cut from the Tree may be set in the Water, and so fasten down the Cover to keep out the Air; and the Holes in the Cover will be sufficient to let the Perspiration of these Branches pass off; which, if pent in, would be very hurtful to them: And you must be careful to carry it upright, that the Water may not reach to the Buds; for it is a very wrong Practice in those who throw their Cuttings all over in Water, which so saturates the Buds with Moisture, that they have no attractive Force left to imbibe the Sap of the Stock, whereby they very often miscarry.

But before I leave this Head, I beg Leave to observe, that tho' it is the ordinary Practice to divest the Bud of that Part of the Wood which was taken from the Shoot with it; yet in many Sorts of tender Trees it is best to preserve a little Wood to the Bud, without which they often miscarry. The not observing this, has often occasion'd some People to imagine that some Sorts of Trees are not to be propagated by Inoculation; whereas, if they had perform'd it in this Method, they might have succeeded, as I have several times experienc'd.

INTYBUS; *vide* Endivia.

JONQUIL; *vide* Narcissus.

IRIS [*res a Rainbow.*] Flower-de-Luce.

The Characters are;

It hath an oblong, fleshy, creeping Root: The Flower consists of six Leaves, three of which are bifid, and stand erect; the other three are reflexed: Upon the Under-part of the arched

Leaves is placed a Congeries of Hairs resembling a Beard. From the very Bottom arises the Male Stamina, carefully defended by a hollow Case of Petals. The Flower grows to the Apex of the Ovary, which sends forth those Beards and Case-like Tubes; and hence it appears like a nine-leav'd Flower.

The Species are;

1. IRIS; *purpurea, five vulgaris.* Park. Par. Common purple Flower-de-Luce.

2. IRIS; *bortensis, pallide cœrulea.* C. B. Pale-blue Garden Flower-de-Luce.

3. IRIS; *bortensis, alba, Germanica.* C. B. White Garden German Flower-de-Luce.

4. IRIS; *alba, Florentina.* C. B. White Florentine Flower-de-Luce.

5. IRIS; *Dalmatica, major.* C. B. Greater Flower-de-Luce of Dalmatia.

6. IRIS; *Sufiana, flore maximo, ex albo nigricante.* C. B. The Chalcedonian Iris, with a large black and white Flower.

7. IRIS; *latifolia, Pannonica, colore multiplici.* C. B. Broad-leav'd Hungarian Flower-de-Luce, with a many-colour'd Flower.

8. IRIS; *Illyrica, flore majore.* Tourn. Flower-de-Luce of Illyricum, with a large Flower.

9. IRIS; *sativa, lutea.* C. B. P. Yellow Garden Flower-de-Luce.

10. IRIS; *lutea, variegata.* Clus. Yellow variegated Flower-de-Luce.

11. IRIS; *latifolia, candida, purpureis venis distincta.* C. B. Broad-leav'd Flower-de-Luce, with a white Flower strip'd with purple.

12. IRIS; *humilis, minor, flore purpureo.* Tourn. Dwarf purple Flower-de-Luce.

13. IRIS; *angustifolia, maritima, major.* C. B. Greater narrow-leav'd Sea Flower-de-Luce.

14. IRIS; *angustifolia, maritima minor.* C. B. Lesser narrow-leav'd Sea Flower-de-Luce.

15. IRIS; *angustifolia, minor, Pannonica, five varicolor.* Clus. Small variable narrow-leav'd Flower-de-Luce of Hungary.

16. IRIS; *humilis, minor, angustifolia, flore variegato.* Dwarf narrow-leav'd Flower-de-Luce, with a variegated Flower.

17. IRIS; *sylvestris, quam Xyrim vocant.* Plin. Raii Syn. Stinking Gladdon, or Gladwyn.

There are several other Varieties of these Flowers, which are preserv'd in some curious Gardens abroad; but these here mention'd, are what I have observ'd in the *English* Gardens: Tho' formerly we were possess'd of a greater Number of them, than are at present to be found, according to the Account which *Parkinson* and some other old Authors have given of them, who reckon up above thirty different Varieties which were then in the *English* Gardens. But these have suffer'd the same Fate as many other valuable Flowers, which have been thrown out, to make room for new Varieties, of which many People are now tired, and would be glad to retrieve their old Sorts again, if they were to be found.

All these Plants are easily propagated by parting their tuberose Roots, which commonly increase very fast. The best Season for this Work is in *August*, when their Flower-stems

Stems are decay'd, and their Leaves begin to change their Colour. But you should observe to do it when the Weather is moist, otherwise the Roots will grow mouldy, and decay. So that if *August* should prove dry, you may defer doing it till *September*; tho' the sooner it be done, the better, that the Roots may be fix'd before the Frost comes on, which is apt to loosen the Ground, and prevent their taking Root. These Plants should have a shady Situation, and a moderately light Soil: but should not be over-dung'd, which is often destructive to their Roots; and when they are too much expos'd to the Sun, their Flowers soon fall away.

The greatest Part of these Plants grow too large for small Flower-Gardens; and their Leaves generally harbour great Quantities of Snails, and other Vermin, which come forth in the Night, and destroy whatever curious Plants grow near them: for which Reasons they are generally banish'd from very curious Gardens, and are proper only for large Gardens, or to plant in Wilderness Quarters, where, if the Trees are not too close, they will thrive and flower extremely well, especially if the Ground about them be annually dug: And the Flowers being proper Ornaments in Basons, for Halls, Chimnies, &c. in the Summer-season, they may be allow'd a Place in some remote Part of the Garden, where few other Things will thrive.

These Roots should be taken up every other Year, and parted, otherwise they will spread greatly over the Ground, and become very troublesome, in harbouring great Quantities of Vermin: Or if they are planted in Wilderness Quarters, they should be cut round at the least every Year with the Spade, to take off the outside Roots, and keep them within Compass.

The 1st, 4th, and 7th Sorts are us'd in Medicine; for which Purpose they may be easily propagated in the manner above directed, observing to plant the fourth Sort in a warmer Soil than the others, and the seventeenth into a moist shady Situation, where it will thrive exceedingly.

The 6th, 15th and 16th Sorts are not so subject to spread as the others, and, for their Beauty, may be admitted into every curious Garden; these should be planted under a Wall or Pale where they may have the Morning Sun; but must not be expos'd to the great Heat of the Mid-day Sun, which would soon destroy them: They delight most in a fresh, light, loamy, undung'd Soil, and to be pretty moist.

These may also be propagated by Seeds, which the Plants generally produce in great Plenty; which should be sav'd from such as have variegated Flowers, those being most likely to produce the greatest Variety.

The Seeds should be sown either in Cases of Earth, or upon an East Border, soon after they are ripe, which will come up the succeeding Spring: But if the Seeds are kept till that Time before they are sown, they will not come up until the second Year, and sometimes

will not grow. The young Plants should be constantly kept clean from Weeds, and in dry Weather should be water'd, which will greatly promote their Growth; and the *Michaelmas* following they should be transplanted into an East Border, at about eight or ten Inches Distance, where they may continue until they flower, which, in the small Sorts, will be the succeeding Spring: but the large Sorts will not flower till the third Year from sowing, when you may mark all such as produce valuable Flowers, which at *Michaelmas* may be transplanted into the Garden; but those which are of little Beauty may be pull'd up in flower, and thrown away, to give the better Sorts more Room.

IRIS BULBOSA; } *vide* Ziphium.
IRIS PERSICA; }

ISATIS. Woad.

The Characters are;

The Flower consists of four Leaves, which are dispos'd in Form of a Cross; out of whose Flower-cup rises the Pointal, which afterwards turns to a Fruit in the Shape of a Tongue, flat at the Edge, gaping two Ways, having but one Cell, in which is contain'd, for the most part, one oblong Seed.

The Species are;

1. ISATIS; *sativa*, five *latifolia*. C. B. Broad-leav'd manured Woad.
2. ISATIS; *sylvestris*, vel *angustifolia*. C. B. Narrow-leav'd wild Woad.
3. ISATIS; *Dalmatica*, major. Bobart. Greater Dalmatian Woad.

There are several other Varieties of this Plant, which are preserv'd in some curious Botanick Gardens; but as they are Plants of little Use or Beauty, so I shall omit mentioning them here.

The first Sort is that which is cultivated in England, for the Use of Dyers, who use it for laying the Foundation of many Colours, especially all Sad-colours.

It is a very rich Commodity, and well worth the Propagating, which is done by Seed.

The Soil that it requires, is one that is dry and warm: it will not be amiss if it be a little gravelly or sandy; and it should have rested long, to be in good Heart: and the richest Garden Ground near great Towns is the best, tho' it will do well in many other Places.

Woad is commonly sown upon a Lay, which they plough into high Ridges, except the Land be very dry; and they harrow the Turf till they break it to Pieces, and pick out all the Grass, Weeds, and Lumps of Earth, and sing them into the Furrows to rot.

The Land for this Seed ought to be finely plough'd and harrow'd, and all the Clods and Turfs broke, and the Stones pick'd up, and carry'd off.

The best Time for sowing it, is the Latter-end of *July*, soon after the Seed is ripe, which will come up in *August*, and must be hoe'd out as is practis'd to *Turnips*, leaving the Plants ten or twelve Inches asunder; by which means they will grow strong, and produce

duce much larger Leaves: And besides, that sown at this Season doth seldom miscarry; whereas that which is sown in the Spring will be very liable thereto; and if it doth not, the Plant will not have half the Strength the first Summer.

It ought to be kept constantly weeded; but if it come up good, it will need the less weeding: The ordinary Price of Weeding is Eight Shillings per Acre.

Some recommend the sowing of it about the beginning of *February*; for which they give this Reason, That whereas it is apt to be spoil'd by the Fly and Grub, it escapes the better being early sown; and if they do kill any of it, they have the better Opportunity of sowing more.

They do this by making Holes with a Stick about seven or eight Inches asunder, and put five or six Seeds into each Hole.

They seldom or never sow it more than two Years upon the same Piece of Land: because, if it be long continu'd, it robs the Soil; but, if it be moderately us'd, it prepares Land for Corn; and where the Soil is rank, it abates the too great Fertility of it.

It is ripe when the Leaf is come to its full Growth, and retains its perfect Colour, and lively Greenness, which is sometimes sooner, and sometimes later, as the Year proves dry or moist.

As soon as it is fit to cut, it should be done with all the Speed that possibly may be, that it may not fade, nor grow pale; and when it is cut, it ought to be immediately carry'd to the Mill. The Manner of Doing which, and the Way of Ordering it, is best learn'd from experienc'd Workmen, and is not to be trusted to a verbal Description of it.

In ploughing it up, and sowing it again, they pick up all the old Roots as they harrow it, except what they design for Seed, which they let stand to the next Year: It many times produces fifty Quarters upon an Acre.

They always keep a good Quantity of Seed by them, to plant the Ground that fails: The Seed of two Years old will sometimes grow as well as at the first. And if they sow or plant it late, if the Ground be dry and hard, they steep it in Water the Day before they sow it, which causes it to come up the sooner.

Good *Wood* may yield five or six Crops in a plentiful Year; tho' it ordinarily yields but four, sometimes but three, especially if it be let stand to grow for Seed: But what grows in Winter they do not use, tho' it is very good for Sheep. The two first Crops are the best, which are usually mix'd in the Seasoning. The latter Crops are much the worse, which, if mix'd with either of the former Crops, spoil the whole.

It many times sells from six Pounds to thirty Pounds a Tun, an Acre commonly yielding about a Tun.

JUDAICA ARBOR; *vide* Siliquastrum.

JUJUBE; *vide* Zizyphus.

JULIANS, or ROCKETS; *vide* Hesperis.

JULY FLOWER; *vide* Caryophyllus.

JULY: Work to be done in the Kitchen-Garden.

At the Beginning of this Month sow the last Crop of *Kidney-Beans* in some well-shelter'd Situation, that they may continue the later in Autumn before the Frost destroys them; and if the Ground be very dry, you should soak the *Beans* six or seven Hours in Water before you plant them, which will greatly forward their Growth.

Toward the Middle or Latter-end of this Month you should sow *Spinage*, *Coleworts*, *Carrots*, *Turnips*, *Onions*, &c. to stand the Winter. Transplant *Savoy*s, *Broccoli*, *Cauliflowers* and *Cabbages*, for Spring Use; as also *Celery* into Trenches, for Winter Use.

Clear your Ground where your Summer Crop of *Cauliflowers* grew; and if you have *Cucumbers* for Pickling between them, (as is the common Practice of the Gardeners near London) you must now draw up the Earth round them with a Hoe, and form it into a Basin, to contain the Water which is given them: And if you have Winter *Cabbages* planted also between the narrow Rows of *Cauliflowers*, you must earth them up, and make the Ground clean from Weeds.

You must also observe to destroy the Weeds in every Part of the Garden, which, if suffer'd to remain, will soon come to Seed at this Season; and if permitted to shed, will fill the Ground so full of Seeds, that by seven Years good Husbandry it will not be extirpated. Observe also to clear your Dung-hills and Lay-stalls from Weeds; for if they are suffer'd to feed there, the Seeds will be carry'd with the Dung into the Garden, and be as troublesome as if the Weeds had been permitted to feed there: which is what few People regard, tho' it is a Thing of great Moment.

In dry Weather observe to water all such Plants as have been lately transplanted, and be sure always to do this in an Evening; for one Watering at that Time is of more Service than three at any other Time of the Day, the Moisture having Time to soak to every Part of the Root, before the Sun appears to exhale it; whereas, when it is given in a Morning, the Sun coming on soon after, the Moisture is drawn up before it reaches the Root.

Gather Seeds from all such Herbs as are now ripe, cutting off the Stalks, and lay them upon Mats in an open, dry, airy Place, that they may harden before they are beaten out of the Husk.

Pull up *Garlick*, *Rocamboles*, *Schalots*, *Onions*, &c. when their Leaves begin to wither, and spread them thin in a dry airy Place, that they may be perfectly dry before they are laid up for Winter Use.

Continue to earth up your *Celery*, which was planted in Drills the preceding Month, as it advances in Height; and tie up the *Endive* that is full grown, to blanch: observing always to do this in the Afternoon of a dry Day; for if the inner Leaves of the Plants are moist when they are ty'd up, they will rot.

Pull

Pull up the Stalks of *Beans*, *Peas*, *Cabbages*, and all such Plants which have produc'd their Crops, that the Ground may be clear; for if these are permitted to remain, they will harbour Vermin to the Prejudice of your other adjoining Crops.

You may, in this Month, repair the Losses of your young *Asparagus-beds*, which were planted in the Spring, by planting fresh Plants where any of them have fail'd; but this should be done in a moist Season.

Your *Melons* now beginning to ripen, should have very little Water given them; which altho' it would increase the Size of the Fruit, yet it would cause them to be watery and ill-tasted.

The Product of the Kitchen-Garden in July.

Artichokes, *Cauliflowers*, *Cabbages*, *Carrots*, *Beans*, *Peas*, *Kidney-beans*, *Turnips*, *Lettuce*, *Endive*, *Purslain*, *Cresses*, *Rape*, *Radish*, *Mustard*, *Turnip*, and most other Sorts of young Sallet; *Cucumbers*, *Melons*, *Onions*, with several other Sorts: And in the *Physick-Garden*, most Sorts of Herbs for Distillation, and all Sorts of aromattick Herbs are now in prime.

Work to be done in the Fruit-Garden and Orchard.

You should now go over your Walls and Espaliers of Fruit-Trees, rubbing off all fore-right Buds which are now produc'd, tying in all such Branches as are loosen'd or irregularly plac'd in their due Position, whereby your Fruit will have the Advantages of Sun and Air to ripen them, and give them a good Flavour; if this be rightly executed, there will be no Occasion to divest the Branches of their Leaves, (as is by some practis'd, to the great Disadvantage of both the Fruit and Trees): Nor can I here forbear repeating what I have more than once taken notice of before; viz. Not to suffer your Fruit-Trees to grow unregarded till this Season, (as is generally practis'd) and then give them what is commonly call'd a Summer-Pruning, which is perform'd by cutting off luxuriant Branches, stopping most of the strong Branches, which occasion their Side-buds to produce autumnal Shoots, which are never good, but are very injurious to the Fruit branches; and by this general and sudden dressing of the Trees, the Fruit which was before greatly shaded and cover'd by the luxuriant Growth of the Branches, are now expos'd to the Sun and Air, to its no small Prejudice; whereas if the Shoots had been constantly train'd in as they were produc'd, and the fore-right Buds rubb'd off, the Fruit could never suffer by any sudden Exposure, but would be continually in an equal Coverture of Leaves, which is of great Advantage to them: Therefore as this Practice is almost general, I think the Errors committed thereby, and the proper Management, cannot be too often inculcated.

You must now go over your Vines, pulling off all the trailing Shoots and wild Wood which are produc'd from the Sides of the Eyes, which if suffer'd to remain, will not only

weaken the Fruit-branches, but also obstruct the Sun and Air from the Fruit.

In the Beginning of this Month, you must bud most Sorts of choice Fruits. The particular Directions for this Work, see under the Article *Inoculation*.

Mow the Grass in Orchards to keep it low, the Fruit now beginning to grow ripe and fall, would be hid if the Grats were tall.

Hoe and cleanse your Nurseries from Weeds, which if suffer'd to grow, would exhaust the Strength of the Ground, and greatly weaken the Trees; and look well to those Trees which were budded the last Season, to tie them up to that Part of the Stock which was left above the Bud, for the strong Winds which often happen at this Season are very apt to blow them out.

Place Glass Phials, fill'd with sweet Water, in different Parts of your Walls, to destroy the Wasps, which would infest your Fruits, and are by the Sweetness of the Water tempted into the Phials, and often drowned.

Look well after Snails in the Mornings and Evenings, but especially after a Shower of Rain, when they will be tempted to come abroad, and may be at that Time easily taken, for these Vermin do great Mischief to Stone-Fruit.

Fruits in Prime, or yet lasting.

Pears: *The Green Chiffel*, *Primitive Muscate*, *Muscadelle-rouge*, *Petit Muscat*, *Orange Musk*, *Cuisse-Madame*, *Gros Blanquette*, *Blanquette-musque*, *Jargonelle*, *Robine*, *Poir sans Peau*, with some others; and in some Places yet continues the *Black Pear of Worcester*, *Lord Cheyne's Green Pear*.

Apples: *Codling*, *Margaret Apple*, *White Juneling*, *Stubbard's Apple*, *Summer Cosing*, *Summer Pearmain*, *Pomme de Rambour*; and still continues, *Deux-ans* or *John Apple*, the *Stone Pippin*, *Oaken Pin*, with some others.

Cherries: *Kentish Cherry*, *Gascoign's Heart*, *White Heart*, *Black Heart*, *Carnation*, *Lukeward*, *Red Heart*, *Ox Heart*, *Amber Heart*, *Bleeding Heart*, *Coroon*, *Common Black Cherry*, with some others of less Note.

Peaches: *Brown and White Nutmeg*, *Ann Peach*, *Albemarle*, *Smith's Newington*, *Bellis* or *Bellows*, *Red Magdalen*, *White Magdalen*, *Rossanna*, *Minion*, *Noblesse*, *Montabonne*, *Bordine*, *Royal George*, *Early Admirable*, with some others of less Note.

Nectarines: *Newington*, *Roman Red*, *Etruge*, *Fairchild's Early Nectarine*, and the *Brunion*.

Plumbs: *Jean-Hatue*, *Morocco*, *Orleans*, *Blue Primordian*, *Violet*, *Royal*, *Blue Perdrigon*, *Mirabelle*, *Imperial*, *White Matchless*, *Maitre Claude*, *Green Gage*, *Fotheringham*, *Damoisine*, *Drap d'Or*, *Gros Damas Violet*, *Cheston*, with some others.

Apricocks: *The Orange*, *Roman*, *Breda*, *Algier*, *Bruxelles*, and *Turkey*.

As also *Currants*, *Gooseberries*, *Raspberries*, *Strawberries*, &c.

And in the Stove, the *Anana* or *Pine Apple*.

P P P P

Works

Works to be done in the Pleasure-Garden and Wilderness.

Take up all late Bulbs which were not fit the last Month, and continue to lay Pinks and Carnations which were not strong enough before; sow Tulip, Anemony, Ranunculus, and other bulbous and tuberoso-rooted Flowers in Cases toward the End of this Month, placing them in the Shade.

Transplant the Bulbous-rooted Iris's, Hyacinth of Peru, Narcissus, and such other bulbous and tuberoso-rooted Flowers as will not endure to be kept long out of the Ground.

Gather the Seeds of such Flowers as are now ripe, preserving them in their Husks till they are quite dry, which will perfect their Maturity and prevent their Decay.

Clear your Garden from all Weeds, but especially those which soon shed their Seeds, and prepare your Beds for Off-sets and seedling bulbous Roots, which should be planted early.

Transplant seedling Pinks, Carnations, Hollyhocks, Campanula's, French Honeysuckle, Canterbury Bell, and such other fibrose-rooted Plants which were sown in April: And towards the End of the Month you may take off the Layers from the old Roots of Carnations, Pinks, Sweet Williams, and such others as are rooted.

Cut down the Stalks of all such Flowers as have done blowing, and tie up to Sticks all such Flowers as are to blow the succeeding Months, lest the Wind break them down and destroy them.

Inoculate Roses, Jasmines, and other curious Shrubs and Trees; this Month being the principal Season for that Work.

Cut and trim Hedges, shear Box-edgings, mow Grass-plats, roll Gravel-Walks, and destroy Weeds in every Part of the Garden.

Plants now in Flower in the Pleasure-Garden.

Carnations, Pinks, Female Balfamine, Marvel of Peru, Bean Caper, Capsicum Indicum, Everlasting Pea, Sweet-scented Pea, Golden Rod of several Kinds, French Marygold, African, Amaranthus's, Amaranthoides, Scarlet Lychnis, Double Rose Campion, Virginian Spiderwort, Annual Stock-July-flower, China Pink, Double Ptarmica or Sneezewort, Larkspurs, some Sorts of Starwort, Sun-flower of different Kinds, Moly's, Virgins Bower, Scarlet Mariagon, Double White Lily, Day Lily, Ornithogalum, Peach-leav'd Campanula, Red Valerian, French Willow, Acanthus, Lychnidea's two or three Kinds, Poppies of divers Kinds, Great Gentian, Sweet Sultan three Kinds, Indian Scabious, Venus Looking-Glass, Nigella, Venus Navel-wort, Thorn Apples, Dwarf Annual Stock, Dwarf Lychnis, Lupines of several Sorts, Linarias several Sorts, White Hellebore, Spanish Figwort, Antirrhinum or Calves Snout of several Sorts, Hieracium's of several Kinds, and some others of less Note.

Hardy Trees and Shrubs now in Flower.

Several Sorts of Roses, Dutch, Late-red, Ever-green, English long-blowing, Scarlet Virginian, and late white Honeysuckles, Spanish

Broom, Virginian Acacia, the Tulip-Tree, Shrub Cinquefoil, Common White, Yellow, and Dwarf Yellow Jasmines, Spirea with yellow Leaves, ditto with Marsh Elder-leaves, Catesby's Climber, Double and Single Pomegranates, Passion Flower, Trumpet Flower, Oleaster or Wild Olive, Agnus Castus, Albæa Frutex, Bladder Sena, Cytissus Lunatus, Cistus's two or three Kinds, Canary Hypericum, Plomis or Sage-Tree two or three Sorts, with some others.

Work to be done in the Green-house and Stove.

Gather the Flowers of your Orange-Trees, where they are produc'd too close, leaving only some of the strongest and best situated to bear Fruit, for too great a Number of Fruit weakens the Trees.

Continue to make Cuttings of such Exotick Plants which you want to increase, provided you have not done it the preceding Month: Shift and fresh Earth your Aloes, Cereus's, Euphorbium's, Indian Figs, Fritillaria Crassa's, and other succulent Plants, setting them in a shady Situation until they have taken Root, but do not give them much Water.

Shift such Exotick Plants as have been rais'd from Seeds in the Spring, into larger Pots, placing such of them as are tender into a Bark-bed, observing to shade the Glasses in the Heat of the Day, and refresh them often with Water.

Give a Quantity of free Air to the most tender Exoticks when the Weather is warm, and little Wind stirring, but in the Day-time shade the upper Glasses of the Stove when the Sun is hot. Stir up the Bark in your Ananaphrame, and add a little fresh Bark to it, to increase the Heat, plunging your Pots down again immediately; but do this in a warm, still, cloudy Day, that the Plants may not suffer by being expos'd to the open Sun or cold Air.

Plant Cuttings of Myrtles, lay down Spanish and Arabian Jasmines, and prune and tie up all Exotick Plants which grow out of Order; but do not trim them to round Heads, (as is the Practice of some) for by this you cut off the flowering Parts, and greatly deface them.

Wash and clean the Leaves of your tender Plants from Filth and Insects, which are very subject to lodge upon the Surfaces of the Leaves of such Trees as are constantly preserv'd in the Stove, and are often very prejudicial to the Plants.

Gather the Seeds of such Exotick Plants as are ripe, laying them upon Papers in the Stove to harden and dry, and then preserve them in the Husk until the Season for sowing them.

Plants in Flower in the Green-house and Stove.

Oranges and Lemons, Myrtles, Amomum Plinii, Barba Jovis or Silver Bush, Cistus Halim folio, Cistus Ledon, two or three Sorts; Spanish yellow Indian Azorian, Arabian and Ilex-leav'd Jasmines, Geraniums of several Sorts, Tree Scabious two Sorts, Colutea Æthiopica, Apocynums of several Kinds, Blue and Scarlet Cardinal's Flower, Cassias of two Sorts, Acacia Indica Aldini; Guidonia Ulmi facie, the

Sensitive

Sensitive and Humble Plants, Coral-Tree, Lotus Argentea Cretica, and Lotus Hamorrhoidalis Anonis, two or three Sorts, Granadilla's two or three Sorts, Coffee-Tree, White Spanish Broom, Fabago Africana arborefcens flore fulpureo, &c. Oleanders red, white, sweet-scented and double-flower'd, Fritillaria Crassa both Sorts, feveral Sorts of Ficoides's, small creeping Cereus, Cotyledons of feveral Sorts, Sedums feveral Kinds, Ketmia's of feveral Sorts, Tibymals of feveral Sorts, Ricinus or Palma Christi, Ricinoides folio multifido, Blue Umbellated Throatwort, Convolvulus's feveral Sorts, Double Indian Nasturtium, Myrto Cistus, Polygala Frutescens, Digitalis Acanthoides, Heliotropium Scorodoniae folio, Gnaphalium Maritimum, Elichrysms feveral Sorts, Caltha Africana Croci folio, &c. Anemonospermus of feveral Sorts, Doria's feveral Sorts, Blue African umbellated Hyacinth, Indian Reed of two or three Sorts, Aloes of feveral Sorts, Yucca, Phalangium foliis cepacis, Zeylon Lily, Dracunculoides, Bassellas, Tetragonocarpos, Viburnum's two or three Sorts, Olives, Rhamnus's two or three Sorts, Papaya, Sifyrinchium, Indian Figs of feveral Kinds, Momordica, Caper-Tree, Phytolacca, with fome others.

JUNE. *Work to be done in the Kitchen-Garden.*

The Beginning of this Month transplant Cabbages and Savoys for Winter Use, either between Rows of Cauliflowers or Beans, which in a short Time will be taken off, and then the new-planted Plants will have full Room to grow, and being shaded by the other Things at first planting, they will take Root sooner than when planted in an open clear Situation; and it is by this, observing to place Crops of different Sorts to succeed each other upon the same Ground, that the Gardeners near London do bring so much to the Markets from small Quantities of Ground.

Hoe and clean Carrots, Parsnips, Onions, Leeks, Beets, and all other late Crops; for if the Weeds are permitted to grow at this Season, they will soon shed their Seeds, and become very troublesome.

Prick out young Plants of all Sorts of sweet Herbs, which were sown in the Spring, as Thyme, Hyssop, Savory, Sweet Marjoram, &c. as also all Sorts of Pot-Herbs, as Clary, Burnet, Sorrel, Marygolds, and many other Sorts, allowing them Room enough to spread, whereby they will be much stronger than those which remain in the Seed-beds.

You may still slip and plant Sage, Rosemary, Scutbarnwood, Lavender and Stachas, &c. tho' the last Month is preferable to this for such Work, the Weather being for the most part more inclinable to Showers.

Clear and hoe the Ground whereon your early Cauliflowers did grow; and if you have Ridges of Cucumbers or Melons between them (as is the common Practice of the London Gardeners) you must dig up the Ground between them, that it may be loose for the Roots of the Plants to strike into, and then lay out your Vines regularly, taking great

Care not to bruise or break them, which would be very injurious to these Plants.

Plant Kidney Beans for a late Crop, and sow Brown Dutch and Common Cabbage Lettuces to come late, observing to place them in a shady Situation, and transplant Lettuce of different Kinds for cabbaging, which were sown in May, planting them also in the Shade; but not under Trees, nor too near a Wall, Pale, or any other Building, which will cause them to run up, and not cabbage.

Transplant Celery into Trenches for Blanching, and Endive upon an open Spot of Ground, and sow Endive Seed to come late: Continue sowing all Sorts of young Sallet-Herbs every Week in shady Borders; for at this Season they will soon grow too large for Use.

Sow Turneps upon a moist Spot of Ground, observing to do it when there is an Expectation of Rain, which will in a few Days bring up the Seeds; and in the Beginning of the Month you may sow Broccoli for the second Crop, and Finocchia for the third.

Observe now to thin out your Finocchia, which was sown the preceding Months, as also to clear it from Weeds, otherwise if it be drawn up slender by being too close, or by Weeds growing amongst it, it will soon run up to Seed, and will be very small: Earth up that which was sown in March, which is now full grown, and when blanched, will be fit for Use. Weed and thin the Plants in your Holes of Cucumbers for Pickling, observing to leave but four of the strongest and best situated Plants, earthing them up at the same Time, and if the Weather be dry, give them some Water to settle the Earth to their Roots.

If the Nights should prove cold, you must continue to cover your Melons with Mats, otherwise the Fruit will change Yellow, and drop off from the Vines; and be very careful not to give them too much Water, which is also very injurious to them.

Gather Snails after Rain, for now the Weather being warm, a Shower will draw them all out from their Holes, whereby they may be easily destroy'd.

Gather Herbs for drying, of such Sorts as are now in Flower, hanging them up in a shady Place that they may dry leisurely, which will cause them to be much better than those dried in the Sun.

In dry Weather, gather Seeds of all Sorts that are ripe, laying them to dry upon Mats or Cloths before they are beaten out of their Husks.

The Products of the Kitchen-Garden in June.

Cauliflowers, Cabbages, Beans, Peas, Artichokes, Carrots, Turneps, Cabbage, Brown Dutch, Imperial, Silesia, White and Black Cos; Royal and Green Cabbage Lettuces; all Sorts of young Sallet Herbs, as Cresses, Chervil, Corn Sallet, Mustard, Rape, Turnep, &c.

All Sorts of sweet Herbs, as Lavender, Thyme, Winter Savory, Hyssop, Marum, Stachas, &c. as also Sage, Clary, Rosemary, Origanum, Penny

Penny Royal, Mint, Baum, and many other Sorts of Medicinal Plants; as also Purslain, Cucumbers, Melons, Finocchio, Parsly, Sorrel, with many others.

Work to be done in the Fruit-Garden and Orchard.

Begin to inoculate Stone-Fruits towards the Middle of the Month, doing it in an Evening or in cloudy Weather.

Look over your Wall Trees and Espaliers, rubbing off all fore-right or exuberant Branches, laying in your young Wood regularly to the Wall at equal Distance; but do not shorten any Branches at this Season (as is too often practis'd) which will cause the side Buds to shoot out and weaken the Branches.

Your Vines must now be regularly fastened up either to the Walls, Espaliers, or if in Vineyards, to the Stakes, as their Shoots are produced, for if they are suffered to hang down, their Leaves will turn their Surfaces the wrong Way, which when the Shoots are afterwards train'd up, will cause the back Part of their Leaves to be upwards, whereby the Fruit will be retarded until they have taken their proper Position again; and at this Season pull off all small side Shoots, and trailing Branches, which if left on, will rob the stronger Shoots, and also exclude the Sun and Air from the Fruit.

Gather such *Peaches* and *Nectarines* as grow too close together, leaving them four or six Inches asunder, according to the Size of their Fruit, and keep the Ground clear from Weeds, both in the Nursery, and also round your bearing Trees, nor should you suffer any Sort of strong rooting Plants to grow too near them, which would rob them of their Nourishment, and greatly weaken their Fruit-branches.

Look well after Snails and other Vermin, which at this Season greatly infest your tender Fruits.

In dry Weather, water such Trees as were transplanted late in the Spring, observing to keep the Surface of the Ground cover'd with Mulch, to prevent the Earth from drying; and nail in such Shoots as those Trees have produced in an horizontal Position, observing to keep the middle Part of the Tree open, especially for the two first Years, for there will be no Danger of that Part being unfurnished.

Fruits in Prime, or yet lasting.

Gooseberries, Strawberries, Raspberries, Currants, Duke, Kentish, Flanders Heart, Black Heart, Lukeward and Spanish Cherries; Masculine Apricock, Early Nutmeg Peach; and in the forcing Frames several Sorts of Peaches, Nectarines, Grapes, Apricocks, &c. and in the Stove, the Ananas or Pine Apple.

Fruits continuing.

Golden Ruffet, Stone Pippin, Deux Anns or John Apple, Oaken Pin, and some other Apples; as also Lord Cheyney's Winter Green, Black Pear of Worcester, Double Flower, Royal d'Huyver, Winter Boncretien, Burgamot Bugi, English Warden, and some other Sorts of Pears if well preserved.

Work to be done in the Flower-Garden.

You must now lay down your *Carnations, Pinks, Sweet-Williams*, and such other Fibrose-rooted Flowers as are propagated by Layers, observing to water them as soon as it is perform'd.

Transplant *Cyclamens, Colchicums, Saffron, Dens Canis, Fritillaria's*, and such other Bulbous-rooted Plants whose Leaves being decay'd, will not endure to be kept long above-ground: And take up the Roots of *Anemonies, Ranunculus's* and *Tulips*, after a Shower, cleaning them from Filth, and lay them to dry in a shady Place before you put them up. The Roots of your *Hyacinths*, which were taken up the last Month, and laid in Earth to ripen, may now be taken out and clear'd from all decay'd Leaves, and other Filth, and spread to dry in an airy shady Place.

Cut off the Stalks of such Flowers as have done blowing, and are wither'd; and tie up all such as are yet in Flower, or that are to come late in the *Autumn*, for they are very apt to break down with very strong Winds.

Your *Carnations*, which now begin to burst their Pods, should be open'd on the other Side, or in two other Places, to make them blow equally; and their Pots should be plac'd upon a Stage (as was directed in the Article of *Carnations*) to prevent their being injur'd by Insects, and their Flowers cover'd with Glasses, to defend them from Wet, and the direct Rays of the Sun, both which are very injurious to them.

Transplant into Nursery-beds all such Sorts of Biennial, Perennial, Fibrose-rooted Flowers as were sown in the Spring, as *Canterbury Bells, French Honey-suckles, Sweet-Williams, Stock July-flowers, Pinks, Carnations, Columbines, Dames July-flower*, with many others, allowing them sufficient Room to grow until September, when they may be transplanted into the Borders of the Pleasure Garden, to remain for Flowering.

Transplant Annuals out of the Hot-bed into Pots and Borders of the Pleasure Garden, observing to do it in a moist cloudy Day, or in the Evening, giving them some Water to settle the Earth to their Roots.

Plants now in Flower in the Pleasure-Garden:

Stock July-flowers of several Sorts, *White Wall-flower* Single and Double, *French Honey-suckle* White and Red, *Lobels, Catch fly, Venus Navel-wort, Flos Adonis, Double and Single Sweet-Williams, Double Perennial Catch-fly*, several Sorts of *Daizies, Bulbous fiery Lily, Orange Lily, Martagons* several Sorts, *Sea Daffodil, Bloody Cranes-bill*, several Sorts of *Bulbous Iris's, Canterbury Bell, Peach-leav'd Bell-flower, Nettle-leav'd Bell-flower* with Blue and White Flowers both Single and Double; *Red, White, and Garden Valerian; Greek Valerian* with Blue and White Flowers, *Buphtalmums* of several Sorts, *Leucanthemum* or *Ox-eye Daizy, Red and White Bachelor's Button* Double and Single, *Double and Single Rose Camptions* both White and Red, *Double-*
ragged

ragged Robin, *Lychnis* from the Alps with deep Red Flowers growing in an Umbel, several Sorts of *Moly's*, *Ornithogalum's*, Savoy and Tradescant's Spider-wort, French Willow, Tree Primrose, Poppies of various Kinds, Columbines of various Colours, Scarlet *Lychnis*, Spanish Fig-wort, Fairchild's Mule, *Lychnidea's*, *Fraxinella* White and Red, Monk's-hood, Great Blue-bottle, Blue-feather'd Hyacinth, Double White Mountain *Ranunculus*, Lark-spurs of several Kinds, Indian Sweet-smelling Scabious, Sweet Sultan, Sweet Peas, Everlasting Peas, several Sorts of Thrift, Sea Holly, Mountain Smooth-leav'd, and Alpine Blue Sea Hollies, Golden Rod of two or three Kinds, Sir George Wheeler's Tutsan, *Nigella*, or Fennel-flower of several Kinds, *Hieracium's* several Sorts, Sun-flower, White Lily, strip'd White Lily, Candy Tuft, Dwarf *Lychnis*, Fox-gloves, *Gladiolus's* several Kinds, White Hellebore, Female Balsamine, French *Marygold*; Africans, Indian Pinks; *Flammula Jovis*, *Periwinkles*, Broad-leav'd Upright Lily of the Valley flower'd, and deep Red *Apocynum's* or Dog's-banes, Yellow Perennial and White Tangier *Fumitories*, Day Lily, Sea Ragwort, some Carnations, with several others of less Note.

Trees and Shrubs which are hardy, now in Flower.

Scorpion and Bladder Sena, Roses of several Kinds, Double and Single Virgins Bower, *Cistus's* of several Sorts, Moon Trefoil, Spanish Broom, Syringa, Oleaster, or Wild Olive, *Spirea Salicis folio*, common White, Dwarf, and common Yellow *Jasmine's*; Italian, Late Red, German Evergreen, English Long-flowering, and common or Late White Honey-suckles; Nettle Tree, Lime Tree, *Spirea Opuli folio*, Catesby's Climber or Carolina Kidney-bean Tree, Upright Sweet Canada Raspberry, Woody Night-shade, Mallow Tree, *Alibaea Frutex*, Tulip Tree, Shrub Cinquefoil, Spanish Tree Germander, Perennial Shrubby *Lamium* or Base Horehound, with some others of less Note.

Work to be done in the Green-house and Stove.

Your Oranges, which now begin to flower, should have the Earth upon the Surface of their Tubs or Pots stirr'd, and a little very rotten Cow-dung laid thereon, making it hollow like a Basin to contain the Water given them; and pull off the Flowers as they open, leaving but few to produce Fruit, and those situated upon the strongest Parts of the Tree; for when too many Flowers are left upon them, it so weakens the Trees, that if they do bring their Fruit to Maturity, they seldom recover their former Strength in several Years.

Plant Cuttings of *Myrtles* in a Bed of light rich Earth, observing to water and shade them as the Season may require, as also Cuttings of the several Sorts of *Geranium's*, *Cytissus's*, and most other woody Plants, treating them in the manner directed under their several Heads.

You may also shift any of your Green-house Plants into larger Pots; tho' the Months of April and May are much preferable to this, for that Work.

Take off Cuttings from the several Kinds of *Cereus's*, *Euphorbium's*, *Sedum's*, *Ficoides's*, *Cotyledon's*, and other succulent Plants, laying them in a shady Part of the Stove to dry about a Week or a Fortnight before they are planted.

Stir up the Bark in those Hot-beds which have been long made, and add a little fresh Bark to them, which will renew their Heat, plunging your Pots down again immediately: But do this in fine soft Weather, lest, by exposing the Plants to the open Air in a cold Day, they should suffer.

Transplant such Seedling Exotick Plants as were rais'd in the Spring into larger Pots, sheltering them from the Violence of the Sun and Wind; and such of them as are very tender, should be plunged into a new Hot-Bed, to bring them forward.

You may now transplant the Canary *Campanula*, whose Leaves are now quite decay'd, planting the Roots into Pots of light, rich, fresh Earth, setting them in the Shade, giving them very little Water until the Plants appear above-ground. And at this Season should be transplanted the Indian Corn Flag, *Hemantus*, Tuberose-rooted Indian *Hyacinths*, and such other Exotick, Bulbous, and Tuberose-rooted Plants whose Leaves are decay'd.

In fine Weather you may open the Glasses of the Stove, to give Air to the Plants: But when the Sun is very hot, the Glasses on the Top of the Stove should be cover'd, to screen the Plants from the violent Heat of the Sun; and observe to refresh them often with Water, as also to cleanse their Leaves from Insects, or any kind of Filth which they may have contracted.

Refresh your *Pine Apples* pretty often with Water: But do not give them too much at once, which is often very hurtful to them; and be careful to shade the Glasses over them in the Heat of the Day.

Plants now in Flower in the Green-house, Garden and Stove.

Oranges, Lemons, Citrons, *Myrtles*, Olives, *Geranium's* of several Sorts, Scarlet *Alibaea*, Barba *Jovis*, Yellow Indian, Spanish, Hex-leav'd, and Arabian *Jasmines*; *Sedums* of several Kinds, *Ficoides's* of several Sorts, *Cotyledon's*, *Aloes* of several Kinds, some Sorts of *Passion Flowers*, French *Physick Nut*, Coffee Tree, Dwarf Pomegranate, Oleanders, Three-leav'd Sumach, Indian Cane, *Cytissus's*, *Cistus's* of several Sorts, *Anomum Plinii*, several Sorts of *Apocynum* or Dog's-bane, Dwarf American *Campanula*, *Anemonospermus's* of several Sorts, *Polygala Africana*, White Spanish Broom, *Colutea Aethiopica flore Phœnicio*, African Tree Scabious, Sensitive Plant, *Alcea frutescens flore rubro*, *Melanthus* or Honey-flower, Tree Sage, with several others.

JUNIPERUS, [is deriv'd of *junior* younger, and *paricus*, Lat. bringing forth, because this Plant

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Plant puts forth its young Fruits when other Berries are ripe.] The Juniper Tree.

The Characters are;

The Leaves are long, narrow, and prickly: The Male Flowers are in some Species produc'd at remote Distances from the Fruit on the same Tree, but in other Species they are produc'd on different Trees from the Fruit: The Fruit is a soft, pulpy Berry, containing three Seeds in each.

The Species are;

1. JUNIPERUS; *vulgaris, fruticosa*. C. B. The common English Juniper.

2. JUNIPERUS; *vulgaris, arbor*. C. B. The Tree, or Swedish Juniper.

3. JUNIPERUS; *Virginiana*. H. L. *Folio ubique Juperino*. Boerb. Ind. The Cedar of Virginia.

4. JUNIPERUS; *Virginiana, foliis inferioribus Juniperinis, superioribus Sabinam, vel Cypresum referentibus*. Boerb. Ind. Red Virginian Cedar.

5. JUNIPERUS; *Virginiana, baccis albis*. The White-berry'd Virginian Cedar.

6. JUNIPERUS; *Bermudiana*. H. L. The Cedar of Bermudas.

The first of these Plants is very common upon dry Heaths in divers Parts of England, but has been introduc'd into Gardens, and was formerly in great Request for Ever-green Hedges: Yet as it is very subject to decay in Patches; and thereby renders such Hedges very unsightly, as also being very troublesome to shear, they have been of late almost intirely rejected. But however improper these Trees may be for Hedges, or to clip into Pyramids or Balls, yet they may have a Place in small Wilderness Quarters amongst Ever-green Plants of low Stature, where, by their Diversity, they will add to the Beauty of those Plantations.

The second Sort will grow to a larger Magnitude, sometimes rising to the Height of eighteen or twenty Feet: This may also be intermix'd with other Ever-green Trees of the same Growth, where, by its different shap'd Leaves and Colour, it will increase the Beauty of such Places.

These Plants are both propagated by sowing their Seeds, the best Season for which is in September, as soon as they are ripe; for if they are kept 'till Spring before they are sown, they will not come up until the second Year. The Ground in which these Seeds are sown should be fresh and light, but it should not be dung'd: It should be well dug, and levell'd very even, then sow your Seeds thereon pretty thick, and sift some Earth over them about half an Inch thick; this Bed will require no farther Care than only to keep it clear from Weeds, and toward the Middle or Latter-end of April you will find some of your Plants appear above-ground; tho' the greatest part of 'em perhaps may lie 'till the Spring following before they come up, at which Time you should carefully clear the Beds from Weeds, and in very dry Weather refresh them with some Water, which will greatly promote their Growth; in this Bed they should remain 'till the following Spring, when

you must prepare some Beds to transplant them into, which should also be of light, fresh, undung'd Soil; and having well dug and cleans'd the Ground from all noxious Weeds and Roots, you should make them level: Then in the Beginning of April, which is the proper Season for Removing these Plants, you should raise up the young ones with a Trowel, preserving as much Earth as possible to their Roots, and plant them into the Beds about a Foot asunder each way, giving 'em some Water, to settle the Earth to their Roots: And if it should prove very dry Weather, you may lay a little Mulch upon the Surface of the Ground round their Roots, which will be of great Service to the Plants.

In these Beds they may remain two Years, observing to keep them clear from Weeds; and in the Spring you should stir the Ground gently between them, that their Roots may with greater Ease strike into it; after which Time they should be transplanted, either into a Nursery, at the Distance of three Feet Row from Row, and eighteen Inches asunder in the Rows, or into the Places where they are to remain for good. The best Season to transplant them (as I before observ'd) is in the Beginning of April; and you should take 'em up carefully, to preserve a Ball of Earth to their Roots; and when planted, their Roots should be mulch'd: All which, if carefully attended to, as also observing to refresh 'em with Water in very dry Weather, until they have taken new Root, will preserve them from the Danger of not growing; and they being extreme hardy, in respect to Cold, will defy the severest of our Winters to injure them, provided they are not planted in a moist or rich Soil.

In order to have these Trees aspire in Height, their under Branches should be taken off, especially where they are inclin'd to grow out strong; but they must not be kept too closely pruned, which would retard their Growth, for all these Ever-green Trees do more or less abound with a resinous Juice, which in hot Weather is very apt to flow out from such Places as are wounded, so that it will not be adviseable to take off too many Branches at once, which would make so many Wounds from which their Sap in hot Weather would flow in such Plenty, as to render the Trees weak and unhealthy.

The three Sorts of Virginia Cedars grow to a much greater Height than the former, and in their Native Country afford excellent Timber for many Uses; but with us there are very few which are above twenty or twenty-five Feet high, though there is no doubt of their growing larger, for they thrive very fast after the three first Years, and resist the sharpest Frosts of our Climate exceeding well, and are very apt to grow strait and regular, provided they are not suffered to shoot out too much at bottom.

These Plants are also propagated by Seeds, which must be procured from Virginia or Carolina, (for they rarely produce ripe Seeds in England)

England) and sown as was directed for the other *Junipers*; but as this Seed can't be procured in *England* till *Spring*, so when sown at that Season, it remains in the Ground until the succeeding *Spring* before the Plants appear, therefore you must observe to keep the Beds clear from Weeds, and not suffer the Seeds to be disturbed, which is often the Fault of some impatient People, who think, because the Plants do not rise the first Year, that they will never come up, and so dig up the Ground again, whereby their Seeds are buried; but if they are let remain, they seldom fail to grow: When the Plants are come up, they must be carefully weeded, and in dry Weather should be refreshed with Water, which will greatly forward their Growth, and the *Spring* following they should be transplanted into Beds (as was directed for the common *Juniper*) in *April*, observing to preserve a Ball of Earth to their Roots, and after they are planted, if the Season be dry, they must be carefully water'd, and the Surface of the Ground cover'd with Mulch, to prevent the Sun and Wind from entering the Earth, to dry their Fibres; but they should not be too much watered, which often proves injurious to these Trees, by rotting their tender Fibres soon after they are emitted, whereby the Plants have been often destroy'd.

In these Beds they may remain two Years, observing to keep them clear from Weeds, and in Winter you should lay a little fresh Mulch upon the Surface of the Ground round their Roots, which will prevent the Frost from penetrating to them, and effectually preserve them; for while the Plants are so young, they are liable to be impair'd by hard Frosts, when too much expos'd thereto; but when they have attain'd a greater Strength, they will resist the severest of our Cold.

After two Years, they should either be removed into a Nursery (as was directed for the common *Juniper*) or transplanted where they are design'd to remain, observing always to take them up carefully, otherwise they are subject to fail upon transplanting, as also to mulch the Ground and water them as was before directed, until they have taken Root, after which they will require no farther Care, than only to keep the Ground clear about their Roots, and to prune up their Side-branches to make them aspire in Height.

The Soil in which you plant these Trees, should be fresh and light, but must not be dunged, especially at the Time when they are planted, for Dung is very hurtful to them, especially if it be not quite rotted to Mould, therefore the Mulch that is laid upon the Surface of the Ground, should not be Dung, but rather some fresh Turf cut from a Common and the Grass turned downward, which is certainly the best Sort of Mulching for most Plants, it affording no ill Scent, nor is it subject to breed Vermin, or be unsightly, and will effectually answer all the Purposes of Mulch, without any Danger of hurting the Plants.

These Trees being thus managed, will in a few Years rise to a considerable Stature, and by the Variety of their Ever-green Leaves, and Manner of Growth, will greatly add to the Beauty of such Plantations, if rightly disposed, which indeed is what we seldom observe in any of the *English* Gardens or Wildernesses, for there are few People who consider the different Growths of the several Trees with which they compose such Plantations, so as to place the tallest growing Trees the backwardest from Sight, and the next Degree to succeed them, and so gradually diminishing till we come to the common *Juniper*, and others of the same Growth, whereby all the Trees will be seen, and the gradual Declivity of their Tops will appear like a verdant Slope, and be much more agreeable to the Sight, as also more advantageous to the Growth of the Trees, than to place Shrubs of humble Growth, near such Plants as will grow to the first Magnitude, whereby the Shrub is hid from Sight, and will be over-shadowed and destroy'd; nor can the Distance which each Tree requires, be so justly proportioned any other way, for in this Distribution the largest Trees being separated by themselves, may be planted at a due Distance, and then those of a middling Growth succeeding, may be accordingly allowed sufficient Room, and the smaller, which are next the Sight, being placed much closer, will hide the naked Stems of the larger Trees, and have an agreeable Effect upon the Sight.

The Timber of these Trees is of excellent Use in *America* for building of Vessels, wainscoting Houses, and for making many Sorts of Utensils, it abounding with a bitter Refin, which prevents its being destroy'd by Vermin, but it is very brittle, and so not proper for stubborn Uses; but however, by increasing the Number of our Timber Trees, we shall find many Advantages, besides the Pleasure their Variety affords, for we may hereby have Trees of very different Kinds, which are adapted to grow in various Soils and Situations, whereby we shall never want proper Trees for all the different Sorts of Soils in *England*, if proper Care be taken in their Choice, which would be a great Improvement of many Parts of this Kingdom, which now lie unplanted, because the Owner, perhaps, finds that neither *Oaks* or *Elms* will thrive there, and so consequently concludes that no other Sort will; which is a great Mistake, for if we consider how different the Structure of Trees is, (being design'd by the Wise Author and Contriver of all Things, to grow on different Soils and Situations) and only observe what Sorts are adapted for growing upon dry, barren Mountains, and what are design'd for the lower and richer Vallies, we need never be at a loss for proper Trees for all Sorts of Ground.

The *Bermudas Cedar* coming from a more temperate Climate, is somewhat tenderer than the former, and more impatient of our Cold (especially while the Plants are young) but afterwards it endures it very well, as may be

be seen by divers Trees which are now growing in *England*, some of which are upward of twenty Feet high, and have resisted several severe Winters without Injury: But these *Cedars* are not of so quick a Growth here, as in a more temperate Climate; for in their native Country they will grow to be large enough for Ship-timber in twenty Years, from Seed (as I have been credibly informed by several Persons who have lived there many Years): However, when they have been some time naturalized to our Country, there is no doubt but they will thrive much better than at present, especially when the Trees here produce Berries, for the young Plants raised therefrom will be much hardier than those procured from foreign Seeds, as is evident in many other Kinds.

These Plants are propagated by Seeds in the same Manner as the former, with only this Difference, that these should be sown in Pots or Tubs of Earth, that they may be removed into Shelter in the Winter-time, otherwise the young Plants are often hurt by hard Frosts; but they will require no more Care than only to be placed under a common Hot-bed Frame, that the Glasses may be constantly kept off in mild Weather, when they can't have too much free Air, and only covered in hard Frosts. These Seeds do constantly remain in the Ground until the second Year before they come up, therefore the Earth in the Pots should not be disturb'd, and in the Summer-time they should be placed in the Shade, to prevent the Earth from drying too fast, and in very dry Weather they should be often watered; but do not give too much Water to them at once, which would rot the Seeds.

The *Spring* following when the young Plants come up, they must be carefully clear'd from Weeds, and in dry Weather refresh'd with Water; but should stand during the Summer-season, in a Place defended from strong Winds, and in Winter must be placed into Shelter, where they may be covered in hard frosty Weather, but must have open Air when the Weather is mild: In *April* following you should transplant them each into a single Half-penny Pot fill'd with fresh, light Earth, being careful to raise them up with a Ball of Earth to their Roots, and when they are planted, you should water them to settle the Earth to their Roots, then place the Pots in a warm Situation, where they may be defended from Sun and Wind; but if you will bestow a moderate Hot-bed to plunge the Pots upon, it will greatly promote their taking new Root; however, you must carefully defend them from the great Heat of the Sun, which is injurious to them when fresh removed; but when they have taken Root, you may expose them by degrees to the open Air: If you suffer the Pots to remain plunged all the Summer, it will preserve the Earth therein from drying so fast as it would do, if they were set upon the Ground.

In *October* you should again remove these Plants into Shelter, or else plunge their Pots into the Ground under a warm Hedge, where

they may be protected from the cold North and East Winds; and in the *Spring* following you must shift the Plants into Pots a Size bigger, taking away some of the Earth from the Out-side of the Ball, and adding some fresh, which will promote their Growth, and so continue to manage them as was before directed, until you plant them out in the Places where they are designed to remain, which should not be done till they are three or four Years old, by which time they will be strong enough to bear the Cold.

The Reason for my directing these Plants to be preserved in Pots until they are planted out for good, is, because they are difficult to transplant, and being tender will require some Shelter while young; and whoever observes the Method here laid down, will find the Plants so managed to gain two Years Growth in Six, from those rais'd in the open Air, and will be in less Danger of being destroy'd; and as the Trouble and Expence of raising them this Way is not great, so it is worth practising, since in a few Years the Trees will recompense the Trouble.

These Plants should have a fresh, light, undunged Soil as the former, and may be placed in Plantations with them, observing to let these be placed in a Line below those, for they will not grow so fast with us as they do, nor do I believe they will make such large Timber, tho' this is much preferable to the Timber of the other Sorts.

The Timber of this Tree is of a redish Colour, and very sweet, and is commonly known in *England* by the Name of *Cedar Wood*, though there are divers Sorts of Wood called by that Name, which come from very different Trees, especially in the *West-Indies*, where there are several Trees of vastly different Appearances which have that Appellation; it is this Sort of Wood which is used for Pensils, as also to wainscot Rooms, and make Stair-Cases, it enduring longer sound than most other Sorts of Timber; which, perhaps, may be owing to some extreme bitter Taste in the Resin, with which the Tree abounds; for it is very remarkable, that the Worms do not eat the Bottoms of the Vessels built with this Wood, as they do those built with *Oak*; so that the Vessels built with *Cedar* are much preferable to those built with any other Sort of Timber, for the Use of the *West India* Seas; but they are not fit for Ships of War, the Wood being so brittle as to split to Pieces with a Cannon Ball; but when well polish'd and neatly fitted up in Wainscot, it appears very handsome, and will be found a valuable Timber in *England*.

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KALI [is an *Asttick* Name which signifies a Sea Plant.] *Glass-wort*.

This is a Plant which grows very common in salt Marshes near the Sea, but is never cultivated

tivated in Gardens. The Ashes of this Plant are used in the Making of Glass.

A KATKIN is an Aggregate of Summits, hanging down in Form of a Rope, or Cat's Tail, as in the Sallow, Hazel, Birch, &c. and is call'd in Latin *Iulus*.

KETMIA [is a Syriack word, of כֶּתְמִיָּה, which signifies a Plant with a Rosy Flower: It is commonly call'd *Althæa Arborescens*.]

The Characters are;

The Flower is compos'd of one intire Leaf, which expands in the Form of those of the common Mallow: The Fruit is oblong, and divided into several Cells, in each of which are contain'd several roundish Seeds.

The Species are;

1. KETMIA; *Syrorum, quibusdam C. B. Althæa frutex* with red Flowers.

2. KETMIA; *Syrorum, flore purpureo-violescente. Tourn. Althæa frutex* with purple Flowers.

3. KETMIA; *Syrorum, flore albo. Boerb. Ind. Althæa frutex* with white Flowers.

4. KETMIA; *Syrorum, floribus ex albo & rubro variis. Tourn. Althæa frutex* with strip'd Flowers.

5. KETMIA; *Syrorum, foliis ex albo eleganter variegatis. Cat. Plant. Hort. Lond. Althæa frutex* with strip'd Leaves.

6. KETMIA; *Sinensis, fructu subrotundo, flore simplici. Tourn. China Rose; vulgò.*

7. KETMIA; *Sinensis, fructu subrotundo, flore pleno. Tourn. Double China Rose, commonly call'd in the West-Indies, Martinico Rose.*

8. KETMIA; *Virginienfis, folio inferiori ulmi, superiori aceris. Boerb. Ind. Virginian Ketmia* with under-Leaves like the Elm, and upper-Leaves like Maple.

9. KETMIA; *Carolinienfis, folio Ribesii, flore amplo flavescente, fundo purpureo. Carolina Ketmia* with Currant Leaves, and an ample yellowish Flower with a purple Bottom.

10. KETMIA; *Carolinienfis, folio oblongo magis acuminato, flore amplo purpureo. Carolina Ketmia* with a long sharp-pointed Leaf, and an ample purple Flower.

11. KETMIA; *Americana, folio papayæ flore magno flavescente, fundo purpureo, fructu erecto pyramidalis, hexagono, semine rotundo, sapore satuo. Boerb. Ind. American Ketmia* with a papaw Leaf, and a large yellowish Flower with a purple Bottom, an hexagonal pyramidal Pod growing upright, and roundish Seeds.

12. KETMIA; *Indica, vitis folio ampliore. Tourn. Indian Ketmia* with an ample Vine Leaf.

13. KETMIA; *Ægyptiaca, semine moschato. Tourn. Egyptian Ketmia* with Seeds smelling like Musk, commonly call'd, in the West-Indies, Musk-Seed.

14. KETMIA; *Indica, aculeata, foliis digitatis. Tourn. Indian Ketmia* with rough-finger'd Leaves.

15. KETMIA; *Indica, Gossypii folio, acetosæ sapore. Tourn. Capsulâ seminalis rubro. Indian Ketmia* with a Cotton Leaf, whose Fruit tastes like Sorrel, commonly call'd, in the West-Indies, Indian or Red Sorrel.

16. KETMIA; *Indica, Gossypii folio, acetosæ sapore capsulâ seminalis albidis. Indian Ketmia* with a Cotton Leaf, and a whitish Seed-vessel, tasting like Sorrel, commonly call'd White Sorrel.

17. KETMIA; *Brasilienfis, folio ficus, fructu pyramidato, sulcato. Tourn. Brasil Ketmia* with a Fig-leaf, and a pyramidal furrow'd Fruit, commonly call'd, in the West-Indies, Okra.

18. KETMIA; *Indica, folio ficus, fructu pentagono recurvo esculento graciliore & longiore. India Ketmia* with a Fig-Leaf, and a five-corner'd, long, slender, eatable Fruit, recurv'd at the Top, commonly call'd, in the West-Indies, Long Okra.

19. KETMIA; *vesicaria vulgaris. Tourn. Venice Mallow, or Bladder Ketmia.*

20. KETMIA; *vesicaria, Africana. Tourn. African Bladder Ketmia.*

21. KETMIA; *Africana, vesicaria, foliis profundius incisus vix crenatis. Boerb. Ind. African Bladder Ketmia* with deeply-cut Leaves.

The five first Sorts are very hardy Shrubs, growing to the Height of seven or eight Feet, and may be train'd up to regular Heads: These are very great Ornaments in small Wilderness Quarters, when regularly dispos'd amongst Plants of the same Growth. They produce their Flowers in August; and, if the Autumn proves favourable, their Seeds will be ripe soon after Michaelmas. These are commonly sold by the Nursery-men, with other Flowering Shrubs, under the Name of *Althæa frutex*: but by the modern Botanists they are remov'd from that Genus, and call'd by the Name of *Ketmia*, because their Seeds are produc'd in Vessels; whereas those of *Althæa* grow in Form of Cheeses, in the same manner as those of the common Mallow.

These Plants are propagated by Seeds, which should be sown upon a Bed of rich light Earth in February or March: And when they come up, they should be constantly clear'd from Weeds; and in dry Weather often refresh'd with Water, which will forward their Growth. In these Beds they should remain until the succeeding Spring, when, in March, they must be carefully transplanted into Beds of the like Soil, at about ten Inches square each way, observing to water them in dry Weather, as also to keep them clear from Weeds: In these Beds they may continue two Years, by which Time they will spread so as to meet each other; therefore you must in March remove them either into the Places where they are design'd to remain, or into a Nursery, allowing them three Feet Distance Row from Row, and eighteen Inches asunder in the Rows; being careful, in taking them up, not to break or bruise their Roots, which would endanger their Growing; and in dry Weather give them some Water until they have taken Root; and lay some Mulch upon the Surface of the Ground, to prevent its drying too fast, and be careful to cut down the Weeds between them.

These Plants may also be propagated by Layers, or Suckers taken from the Roots of

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old Trees. But the latter Method is by no means adviseable; because the Plants rais'd that way are seldom so well rooted, and are very subject to produce Suckers, whereby the Shrubs are render'd unsightly.

The former Method may be practis'd, in order to preserve the particular Kinds: but as they are so easily propagated by Seeds, which generally produce the handsomest Plants, and there will be a Chance to obtain different colour'd Flowers that Way, so it is generally preferr'd to any other Method. They will also take by Inarching, whereby the several colour'd Flowers may be obtain'd upon one and the same Tree; and by this Method, that Sort with variegated Leaves may be increased. These Shrubs require very little Culture, but only to clear them from Weeds, and to dig the Ground about them every *Spring*; and if there are any decay'd Branches, they may be at that Time cut out; but they will not require any other Pruning.

The sixth and seventh Sorts are tender, coming from a warmer Country: These may be propagated by Seeds, which should be sown on a Hot-bed in the *Spring*; and when they are come up, they should be transplanted into another moderate Hot-bed to bring them forward: After which, they must be planted into Pots fill'd with fresh light Earth, and plung'd into a Hot-bed, to encourage their Rooting; and in *June* they may be expos'd to the open Air in some Place where they may be defended from strong Winds: but they must be hous'd early in *Autumn*, when they should be plac'd in a warm Green-house, where they will endure the Winter very well without any artificial Warmth: Tho' indeed they will make but very little Progress in this Management, nor will they ever produce Flowers, unless they are in the succeeding *Spring* plac'd into a moderate Bark-bed in the Stove, where they will thrive exceedingly, And if a due Proportion of Air be given to them, that they may not draw up too fast, they will produce Flowers in the *Autumn*; but unless they have the Assistance of a Fire, they will scarcely ripen their Seeds in *England*.

These Plants were originally brought from *China*, where they are greatly admir'd, not only for their Beauty, but also for an odd Circumstance in their Flowers, which is, their changing Colour at different Times of the same Day; in the Morning they are White, at Noon Red, and in the Evening Purple. These Flowers are in Shape somewhat like the *Holiboek*, but seem to be of short Duration: The Double being much preferable to the Single, the Seeds of that should be constantly sow'd; for amongst the Plants produc'd from Seeds of the Double, there will always be Single Flowers produc'd; as is the Case of all Double Flowers which produce Seeds. They are known in the *West-Indies*, where they are now in great Plenty, by the Name of *Martimico Rose*; I suppose, because the Inhabitants of that Island first procur'd the Seeds; and from thence they have since been spread into most of the other Islands.

The eighth, ninth, and tenth Sorts are Perennial Plants, which die to the Surface every *Winter*, and rise again the succeeding *Spring*: They commonly produce their beautiful Flowers late in *Autumn*, but rarely perfect Seeds in our Climate. They are propagated by Seeds, which are easily procur'd from *Virginia* or *Carolina*, where they are in great Plenty. The Seeds should be sown in *March* upon a moderate Hot-bed; and when the Plants come up, they should be removed into small Pots fill'd with light rich Earth, and plung'd into another Hot-bed, to bring them forward: And in the Month of *June* they may be expos'd to the open Air, in a well-shelter'd Situation, where they may remain until *October*, when they must be remov'd into Shelter for the Winter-season: During which Time they will require no farther Care than to be protected from severe Frosts; so that if they are plac'd into a Hot-bed Frame, where they may be expos'd to the open Air in mild Weather, and only cover'd in Frosts, they will do better than when they are plac'd into the Green-house.

In the *Spring* they may be turn'd out of the Pots, and planted into the full Ground, under a warm Wall or Pale, where they will thrive much better than in Pots, and will produce their Flowers much larger, and in greater Quantities: Tho' if you would obtain Seeds from them, the only Method is, to keep one of each Sort in Pots, which should be plung'd into a very moderate Bark-bed in the Stove, giving them a great Share of Air; in which Place they will flower in *June*, and produce ripe Seeds in *Autumn*.

The 11th, 12th, 13th, 14th, 15th, 16th, 17th, and 18th Sorts are much tenderer than any of the former: These are all propagated by Seeds, which must be sown on a Hot-bed early in the *Spring*; and when the Plants are come up, they should be each of 'em transplanted into a separate small Pot fill'd with light fresh Earth, and plung'd on a fresh Hot-bed, where they should be frequently water'd, and in warm Weather the Glasses should be rais'd with Bricks, to admit fresh Air to them, which will prevent their drawing up weak; and when their Roots have fill'd the small Pots, they should be shaken out of 'em, and put into larger, and remov'd to a third Hot-bed, where they may remain until they are grown up to touch the Glasses; observing (as was before directed) to give them Water frequently, as also a large Share of Air in warm Weather; then you should put them into larger Pots, and remove 'em into the Stove, where they will produce their Flowers in *July*, and in *August* their Seeds will ripen: But except they are thus manag'd, they will rarely produce either Seeds or Flowers in our Climate; tho' they may be kept alive in the Summer, if planted in the full Ground.

These Plants, tho' they may produce Seeds the first Year, yet may they be continu'd two or three Years, if preserv'd in a moderate Stove in Winter, and frequently refresh'd with Water: yet since they are easily rais'd from Seeds, and young Plants are much more

sightly

lightly than the old ones; it is hardly worth while to fill a Stove with them, since there are so many other Sorts that will not flower or seed the first Year, which will take up all the Room there in Winter.

The Flowers of these Plants are very beautiful, but are of short Duration, seldom continuing longer than one Day; but they are succeeded by fresh Flowers, if the Plants are strong and healthy, otherwise there is little Pleasure in them in our Country: but in the *West-Indies*, where they grow in great Plenty, and often arise to the Height of a Shrub, they are more productive of Flowers, and are in great Esteem amongst the Inhabitants of those Countries.

The thirteenth Sort is by some People valu'd for the exceeding Sweetness of its Seeds; as are the fifteenth and sixteenth Sorts for their Seed-vessels, the Juice of which the People of *Barbadoes*, *Jamaica*, &c. make use of, to add a pleasant Tartness to their Viands. And the Pods of the seventeenth and eighteenth Sorts are by them put into their Soups to thicken them. For all which Purposes these Plants are much cultivated in those Countries; but with us they are preserv'd only as Curiosities.

The nineteenth, twentieth, and twenty-first Sorts are Annual Plants, which are propagated by sowing their Seeds in *March*, in the Places where they are design'd to remain; for they generally form downright Woody Roots, and seldom succeed well if transplanted, except it be done while the Plants are very young: They delight in a fresh light Soil, and an open Situation: for if they are over-shaded with Trees, they never thrive well, nor produce so great a Number of Flowers.

They are very proper Ornaments for the Borders of Pleasure-Gardens, where, being intermix'd with other Annual Plants, they make an agreeable Variety, and are very hardy, requiring no other Culture than only to sow their Seeds, and keep them constantly clear from Weeds. They produce their Flowers in *June* and *July*, and their Seeds are perfected soon after; and tho' their Flowers are of short Duration, seldom continuing open above half a Day (which occasion'd *Gerard* in his *Herbal*, to call them *Flowers of an Hour*); yet they are every Day succeeded by fresh Flowers until the Frost prevents them.

KITCHEN - GARDEN: The *Kitchen-Garden* should always be situated on one Side of the House, so as not to appear in Sight, but must be plac'd near the Stables for the Convenience of Dung; which ought always to be consider'd in the Disposition of the Buildings, and the laying out of the Garden: for if this Garden be plac'd at a great Distance from the Stables, the Labour will be very great in wheeling the Dung, and such Expences should ever be avoided, if possible.

As to the Figure of the Ground, that is of no great Moment, since in the Distribution of the Quarters all Irregularities may be hid, though, if you are at full Liberty, an exact Square is preferable to any other Figure.

The great Thing to be consider'd, is, to make Choice of a good Soil; not too wet, nor over dry, but of a middling Nature; nor should it be too strong or stubborn, but of a pliable Nature, and easy to work: And if the Place where you intend to make the *Kitchen-Garden* should not be level, but high in one Part and low in another, I would by no means advise the levelling it; for by this Situation you will have an Advantage which could not be obtain'd on a perfect Level, which is, the having one Part of dry Ground for early Crops, and the low Part for late Crops, whereby the Kitchen may be the better supply'd throughout the Season with the various Sorts of Herbs, Roots, &c. And in very dry Season; when in the upper Part of the Garden the Crops will greatly suffer with Drought, then the lower part will succeed, and so *vice versa*; but I would by no means direct the choosing a very low moist Part of Ground for this Purpose, for although in such Soils Garden-herbs are commonly more vigorous and large in the Summer-season, yet they are seldom so well tasted or wholesome as those which grow upon a moderate Soil: and especially since in this Garden your choice Fruits should be planted, so it would be wrong to have a very wet Soil.

This Garden should be fully expos'd to the Sun, and by no means overshadow'd with Trees, Buildings, &c. which are very injurious to your Kitchen-Plants and Fruit-Trees; but if it be defended from the North Wind by a distant Plantation, it will greatly preserve your early Crops in the Spring; as also from the strong South-West Winds, which are very hurtful in Autumn to Fruit and Garden-herbs.

The Quantity of Ground necessary for a *Kitchen-Garden* must be proportion'd to the Largeness of the Family, or the Quantity of Herbs desir'd: For a small Family, one Acre of Ground may be sufficient; But for a large Family, there should not be less than three or four Acres, because when the Ground is regularly laid out, and planted with *Espaliers* of Fruit-Trees, as will hereafter be directed, this Quantity will be found little enough, notwithstanding what some Persons have said on this Head.

This Ground must be walled round, and if it can be conveniently contriv'd so as to plant both Sides of the Walls, it will be a great Addition to the Quantity of Wall-Fruit. These Walls should be built about twelve Feet high, which will be a sufficient Height for any Sort of Fruit. If the Soil where you intend to place your *Kitchen-Garden* be very strong, then you should plow or dig it three or four times before you plant any thing therein; and if you throw it up in Ridges to receive the Frost in Winter, it will be of great Service to meliorate and loosen its Parts.

The Manure which is most proper for such Soils, is Sea-coal Ashes, and the Cleansing of Streets or Ditches, which will render it light much sooner than any other Dung or Manure, and the greater the Quantity of Ashes the better, especially if the Ground be cold; and where

where these Ashes are not to be obtain'd in Plenty, Sea-sand is very proper, or rotten Wood; or the Parts of Vegetables rotted is very good; all which will greatly loosen the Soil, and cause it to be not only easier to work, but also more advantageous for the Growth of Plants.

But, on the contrary, if your Soil be light and warm, you should manure it with rotten Neats-Dung, which is much preferable to any other for hot Soils; but if you use Horse-Dung, it must be well rotted, otherwise it will burn up the Crops upon the first hot dry Weather.

The Soil of this Garden should be at least two Feet deep, (but if deeper, it will be still better) otherwise there will not be Depth enough for many Sorts of esculent Roots, as Carrots, Parsnips, Beets, &c. which run down pretty deep in the Ground, and most other Sorts of esculent Plants delight in a deep Soil.

You should also endeavour to have a Supply of Water in the different Parts of this Garden, which, if possible, should be contain'd in large Basins or Reservoirs, where it may be expos'd to the open Air and Sun, that it may be soften'd thereby; for such Water as is taken out of Wells, &c. just as it is used, is by no means proper for any Sort of Plants.

In the Distribution of this Garden, after having built the Walls, you should lay out Banks or Borders under them, which should be at least ten Feet broad, whereby the Roots of the Fruit-Trees will have greater Liberty than in such Places where the Borders are not above three or four Feet wide; and upon these Banks you may sow many Sorts of early Crops, if expos'd to the South; and upon those expos'd to the North, you may have some late Crops; but I would by no means advise the planting any Sort of deep-rooting Plants too near the Fruit-Trees; but rather to have some Reed Hedges fix'd in some of the warmest Quarters, under which you should sow and plant early Peas, Beans, &c. where they will thrive as well as if planted under a Wall, and hereby your Fruit-Trees will be intirely freed from such troublesome Plants.

Then you should proceed to dividing the Ground out into Quarters, which must be proportion'd to the Largeness of the Garden; but I would advise never to make them too small, whereby your Ground will be lost in Walks, and the Quarters being inclos'd by Espaliers of Fruit-Trees, the Plants therein will draw up slender, and never arrive to half the Size as they would do in a more open Exposure.

The Walks of this Garden should be also proportion'd to the Size of the Ground, which in a small Garden should be six Feet, but in a large one ten; and on each Side of the Walk should be allow'd a Border three or four Feet wide between the Espalier and the Walk, whereby the Distance between the Espaliers will be greater, and the Borders being kept constantly work'd and manur'd, will be of great Advantage to the Roots of the Trees: And in these Borders may be sown some small Sallet,

or any other Herbs, which do not continue long, or root too deep, so that the Ground will not be lost.

But the Walks of these Gardens should not be gravel'd; for as there will constantly be occasion to wheel Manure, Water, &c. upon them, so they would soon be defac'd and render'd unsightly; not should they be laid with Turf, for Green Walks would absorb the Rays of Light too much, and thereby cause the Fruit to be ill-tasted: But on the contrary, only level the Surface of the Walks; and if you have either Lime-Rubbish, or Sand just to cover over the Tops of them, to render them drier or fitter to walk on than the natural Soil, they will be much preferable to any other Sort of Walks.

The best Figure for the Quarters to be dispos'd into, is a Square or an Oblong, where the Ground is adapted to such a Figure; otherwise they may be triangular, or of any other Shape which will be most advantageous to the Ground.

These Quarters should be constantly kept clear from Weeds; and when any Part of the Ground is unoccupied, it should always be trench'd up into Ridges, that it may sweeten and imbibe the nitrous Particles of the Air, which is of great Advantage to all Sorts of Land, and the Ground will then be ready to lay down whenever it is wanted.

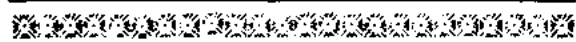
The Ground in these Quarters should not be sown or planted with the same Crop two Years together, but the Crops should be annually chang'd, whereby they will prove much better than when they constantly grow upon the same Spot: Indeed the Kitchen-Gardeners near London, where Land is dear, are often oblig'd to put the same Crop upon the Ground for two or three Years together; but then they dig and manure their Land so well every Year, as to render it almost new; tho' notwithstanding all this, it is constantly observ'd, that fresh Land always produces the best Crops.

In one of these Quarters, which is situated nearest to the Stables, and best defended from the cold Winds, should be the Place where you raise your early Cucumbers and Melons; for which Purpose 'twill be very proper to surround that Part with a Reed-Hedge, which will hide the Beds from Sight, and preserve them from Winds: The Size of this Place should also be proportion'd to the Quantity of Beds intended, but it should be large enough to contain two Years Beds, or else you should have two of these Places, that you may every Year change them, which will be found of great Advantage to your Plants: But if your Garden be too small to admit of this, then you should always prepare a sufficient Quantity of fresh Earth for these Beds, otherwise they will not succeed well.

The most important Points of general Culture consist in well digging and manuring the Soil, and giving a proper Distance to each Plant according to their different Growths, (which is constantly exhibited in their several Articles in this Book) as also to keep them clear

clear from Weeds; for if Weeds are permitted to grow until their Seeds are ripe, they will shed upon the Gound, and fill it so as not to be gotten out again in several Years: You should also observe to keep your Dung-hills always clear from Weeds, for it will be to little Purpose to keep the Garden clean, if this is not observ'd; for the Seeds falling amongst the Dung will be brought into the Garden, whereby there will be a constant Supply of Weeds yearly introduc'd, to the no small Damage of your Plants, and a perpetual Labour occasion'd to extirpate them again. As for all other necessary Directions, they will be found in the Articles of the several Sorts of *Kitchen-Garden* Plants, which renders it needless to be repeated in this Place.

KNIGHT'S CROSS or **SCARLET CROSS** is the Scarlet *Lychnis*; vide *Lychnis*.



L A

LABIATE-FLOWERS, are such as have Lips; or, more properly, a Labiated Flower is an *irregular monopetalous Flower*, divided into two Lips; the upper is call'd the *Crest*, the under the *Beard*: Sometimes the *Crest* is wanting, and then the *Style* and *Chives* supply its Place; as in the *Ground-Pine*, *Scordium*, *Bugula*, &c. but the greatest Part have two Lips; which in some Species, the *Upper-lip* is turn'd upwards, as the *Ground-Ivy*, &c. but most usually the *Upper-lip* is convex above, and turns the hollow Part down to the *Lower-lip*, and so represents a kind of *Helmet* or *Monk's-hood*, from whence these are call'd *Galeate*, *Cucullate*, and *Galericulate* Flowers, in which Form are most of the *Verticillate* Plants.

LABLAB; vide *Phaseolus*.

LABRUM VENERIS; vide *Dipsacus*.

LABRUSCA; vide *Vitis*.

LABURNUM; vide *Cytissus*.

LABYRINTH, [*Δαλνερν*] a winding, mazy, and intricate turning to and fro through a Wilderness or a Wood.

The Design of a *Labyrinth* is to cause an intricate and difficult Labour to find out the Center; and the Aim is to make them so intricate, that a Person may lose himself in it, and meet with as great a Number of Stops and Disappointments as is possible, they being the most valuable that are most intricate.

As to the Contrivance of them, it will not be possible to give Directions in Words; there are several Plans and Designs in Books of Gardening: They are rarely met with but in great and noble Gardens, as *Hampton-Court*, &c.

There are two ways of making them; the first is with single Hedges: This Method has been practis'd in *England*. These, indeed, may be best where there is but a small Spot of Ground to be allow'd for the making them; but where there is Ground enough, the Double are most eligible.

Double ones, or those that are made with double Hedges of a considerable Thickness of Wood between Hedge and Hedge, are approv'd as much better than single ones, as is the manner of making them in *France* and other Places, of all which that of *Versailles* is allow'd by all to be the noblest of its kind in the World.

It is an Error in *Labyrinths* in making them too narrow, for by that means the Hedges must be kept close clipt; whereas, if the Walks be made wider, according to the foreign Practice, they will not stand in need of it.

The Walks are made with Gravel, usually set with Horn-beams; the Palisades ought to be ten, twelve or fourteen Feet high; the Horn-beam should be kept cut, and the Walks roll'd.

LACHRYMA JOBI; [so call'd, because the Seed of it resembles a Tear or Drop.] Job's Tears.

The Characters are;

It hath the whole Habit of a Reed; the Male Flowers (which have no Petals) are produc'd in a Spike on different Parts from the Female of the same Plant; the Ovary is a long Tube with two Horns, which becomes a hard, strong Fruit, containing one Seed.

This is a sort of Corn which is often cultivated in *Portugal*, *Italy*, and some other warm Countries, where they string the Seeds (which are very smooth, and of a bright Ash-colour) for Beads; and in scarce Years of other Grain, I have been inform'd, the poorer Sort of People make Bread of it, but I do not find it is any where cultivated for that Purpose; the natural Place of its Growth is in *Candia*, and the other Islands of the *Archipelago*.

It is seldom cultivated in *England*, unless by way of Curiosity; and rarely produces ripe Seeds with us, except in very warm Seasons: The Seeds of this Plant should be sown upon a light Soil and in a warm Situation early in the Spring; and when the Plants are come up, they must be carefully transplanted to the Distance of ten Inches or a Foot each way, observing to water them until they have taken new Root; after which they will require no other Culture than to clear them from Weeds, and if the Season proves warm, they will perfect their Seeds in Autumn.

LACTIFEROUS PLANTS, are such as abound with a milky Juice, as the *Tithymalus*, *Sonchus*, *Lactuca*, &c.

LACTUCA; [so call'd from *Lac*, Lat. *Milk*, because the Leaves, Stalks, Flower and Branch being broken, plentifully emit a Milk, or white milky Juice, quickly turning yellow and bitterish.] Lettuce.

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The Characters are ;

It hath a fibrous Root, which is, for the most part, annual: The Leaves are smooth, and grow alternately upon the Branches; the Stalks are, for the most part, slender, and stiff, and do commonly terminate into a sort of Umbel; the Cup of the Flower is oblong, slender, and scaly; the Seeds are oblong, depress'd, and generally terminate in a Point.

It would be beside my Purpose to mention in this Place the several Sorts of *Lettuce* that are to be found in Botanick Writers, many of which are Plants of no Use, and are never cultivated but in Botanick Gardens for Variety, and some of them are found wild in many Parts of England; I shall therefore pass over those here, and only mention the several Sorts which are cultivated in the Kitchen-Garden for Use:

1. Common or Garden *Lettuce*. 2. Cabbage *Lettuce*. 3. Silesia *Lettuce*. 4. Dutch Brown *Lettuce*. 5. Aleppo *Lettuce*. 6. Imperial *Lettuce*. 7. Green Capuchin *Lettuce*. 8. Versailles or upright white Cos *Lettuce*. 9. Black Cos. 10. White Cos. 11. Red Capuchin *Lettuce*. 12. Roman *Lettuce*. 13. Prince *Lettuce*. 14. Royal *Lettuce*.

The first of these Sorts is commonly sown very young for cutting, to mix with other small Sallet Herbs, and is only different from the second Sort, in being a Degeneracy therefrom, or otherwise the second is an Improvement by frequent Cultivation from the first; for if the Seeds are saved from such Plants of the second Sort as did not cabbage closely, the Plants produc'd from that Seed will all degenerate to the first Sort, which is by the Gardeners call'd *Laped Lettuce*, to distinguish it from the other, which they call *Cabbage Lettuce*. The Seeds of the first, which are commonly sav'd from any of the Plants, without having Regard to their Goodness, are generally sold at a very cheap Rate, (especially in dry Seasons, when these Plants always produce the greatest Quantity of Seeds); tho' sometimes this Seed is sold in the Seed-shops, and by Persons who make a Trade of selling Seeds for the *Cabbage-Lettuce*, which is often the Occasion of Peoples being disappointed in their Crop: So that this Sort should never be cultivated but to be cut up very young, for which Purpose this is the only good Sort, and may be sown any time of the Year, observing only in hot Weather to sow it on shady Borders, and in the Spring and Autumn upon warm Borders; but in Winter it should be sown under Glasses, otherwise it is subject to be destroy'd by severe Frosts.

The *Cabbage Lettuce* may also be sown at different Times of the Year, in order to have a Continuation of it thro' the whole Season; the first Crop is generally sown in February, which should be upon an open warm Spot of Ground, and when the Plants are come up, they should be thin'd out, to the Distance of ten Inches each Way, which may be done by hoeing them out as is practis'd for Turnips, Carrots, Onions, &c. provided you have no Occasion for the superfluous Plants, otherwise they may be drawn up and transplanted into another Spot of good Ground at the same

Distance, which if done before the Plants are too large, they will succeed very well, though they will not be so large as those which were left upon the Spot where they were sown; but they will come somewhat later, which will be of Service, where People do not continue sowing every Month.

You must also observe in sowing the succeeding Crops, as the Season advances, to chuse a shady moist Situation; but not under the Drip of Trees; otherwise in the Heat of Summer, they will run up to Seed before they cabbage: In the beginning of August, you should sow the last Crop, which is to stand over Winter, and should be sown thin upon a good light Soil, in a warm Situation, and when the Plants are come up, they must be hoed out so as to stand singly, and cut down all the Weeds to clear them; and the Beginning of October they should be transplanted into warm Borders, where, if the Winter is not very severe, they will stand very well; but in order to be sure of a Crop, it will be advisable to plant a few upon a Bed pretty close, where they may be arched over with Hoops, and in severe Frosts they should be covered with Mats and Straw, or Pease-haulm, to secure them from being destroy'd, and in the Spring of the Year they may be transplanted out into a warm, rich Soil at the Distance before-mention'd; but still those which grew under the Wall, if they escaped the Winter, and were suffer'd to remain, will cabbage sooner than those which are remov'd, but you must observe not to place them too close to the Wall, which would occasion their growing up tall, and prevent their being large or hard.

In order to save good Seeds of this Kind, you should look over your *Lettuces* when they are in Perfection, and such of them as are very hard and grow low, should have Sticks thrust into the Ground, by the Sides of as many of them as you intend for Seed, to mark them from the rest, and you should carefully pull up all the rest from amongst them as soon as they begin to run up, if any happen to be left, left by intermixing with the good ones, the Seeds may degenerate.

It may be some Persons may object, that suppose some bad ones should happen to be left amongst them (for Seeds to sow for small Sallets) yet the good ones being mark'd, the Seeds need not be mix'd, and so no Danger can ensue from thence; but notwithstanding ever so much Care being taken to keep the Seeds separate, yet, whether from the intermixing of the *Farina* during the Time of their being in Flower, or what other Cause, I can't say, but it hath been often observ'd, that where good and bad Plants have seeded upon the same Spot, the Seeds of the good Plants which were carefully saved separately, have very much degenerated, and proved worse than such as have seeded by themselves: The Seeds should always be saved either from those which stood through the Winter, or those which were sown early in the Spring,

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for the late ones very seldom perfect their Seeds.

The *Silesia*, *Imperial*, *Royal*, *Black*, *White* and *Upright Cos* Lettuces may be sown at the following Times: The first Season for sowing these Seeds, is at the latter End of *February*, or the Beginning of *March*, upon a warm light Soil, and an open Situation, i. e. not overshadowed with Trees, and when the Plants are come up, they should be either hoed out or transplanted into another Spot of Ground, (as was directed for the *Cabbage Lettuce*) observing to leave these Sorts fifteen or sixteen Inches apart each Way, which will be full near enough for these Plants, especially if the Soil be good, and you must carefully keep them clear from Weeds, which is the only Culture they will require, except the *Black* and *White Cos Lettuce*, which should be tied up when they are full grown (in the Manner as was directed for blanching of *Endive*) to whiten their inner Leaves, and render them crisp, otherwise they are seldom good for much, rarely cabbaging without this Assistance.

When your Lettuces are in Perfection, you should look over them, and mark as many of the best of them as you intend for Seed (in the same Manner as was before directed for the common *Cabbage Lettuce*) being very careful not to suffer any ordinary ones to seed amongst them, as was before observ'd, which would prove more injurious to these Sorts than to the common, as being more inclinable to degenerate with us, if they are not carefully preserved.

You may also continue these Sorts through the Season, by sowing of them in *April*, *May* and *June*, observing (as was before directed) to sow the late Crops in a moist, shady Situation, otherwise they will run up to Seed before they grow to any Size; but in *August*, toward the latter End, you may sow of these Sorts to abide the Winter, which Plants should be transplanted either under Glasses, or into a Bed which should be arched over with Hoops, in order to be cover'd in the Winter, otherwise in hard Winters they are often destroy'd; but you must constantly let these Plants have as much open free Air as possible when the Weather is mild, only covering them in hard Rains or frosty Weather; for if they are kept too closely cover'd in Winter, they will be subject to a Mouldiness, which soon rots them.

In the Spring these Plants should be planted out into a rich light Soil, allowing them at least eighteen Inches Distance each Way; for if they are planted too close they are very subject to grow tall; but seldom cabbage well: And from this Crop, if they succeed well, it will be proper to save your Seeds, tho' you should also save from that Crop sown in the Spring, because sometimes it happens that the first may fail by a wet Season, when the Plants are full in Flower, and the second Crop may succeed, by having a more favourable Season, and if they should both succeed, there will be no harm in that, since the Seeds will grow very well when two Years old, and if well saved at three; but this will not always happen.

The most valuable of all the Sorts of Lettuces in England are the *Versailles*, the *Silesia* and *Cos*, tho' some People are very fond of the *Royal* and *Imperial Lettuces*; but they seldom sell so well in the London Markets as the other, nor are so generally esteem'd.

The *Brown Dutch* and *Green Capuchin Lettuces* are very hardy, and may be sown at the same Seasons as was directed for the common *Cabbage Lettuce*; and are very proper to plant under a Wall or Hedge to stand the Winter, where many times these will abide, when most of the other Sorts are destroy'd, and therefore they will prove very acceptable at a Time when few other Sorts are to be had; they will also endure more Heat and Drought than most other Sorts of Lettuce, which renders them very proper for late sowing, for it often happens in very hot Weather, that the other Sorts of Lettuce will run up to Seed in a few Days after they are cabbag'd, whereas these will abide a Fortnight or three Weeks in good Order, especially if Care be taken to cut the forwardest first, leaving those that are not so hard cabbag'd to the last. In saving of these Seeds the same Care should be taken to preserve only such as are very large and well cabbaged, otherwise the Seeds will degenerate, and be good for little.

The *Red Capuchin*, *Roman* and *Prince Lettuces* are pretty Varieties, and are very early Cabbagers, for which Reason a few of them may be preserv'd; as may also some of the *Alpen*, for the Beauty of its spotted Leaves; tho' very few People care for either of these Sorts at Table, when the other more valuable ones are to be obtain'd; but in a Scarcity, these may supply the Place pretty well. The Seeds of these must also be saved from such as cabbage best, otherwise they will degenerate, and be good for little.

In saving Seeds of all these Sorts of Lettuce, you should observe, when the Plants have run up, to fix a Stake down by the Sides of each, to which the Stem should be fasten'd, to prevent their being broke, or blown out of the Ground by Wind, to which the *Silesia* and the other large-growing Lettuces are very subject when they are in Flower. You must also observe to cut such Branches of the large-growing Lettuces as ripen first, and not wait to have the Seed of the whole Plant ripe together, which never happens, but, on the contrary, some Branches will be ripe a Fortnight or three Weeks before others; and when you cut them, they must be spread upon a coarse Cloth in a dry Place, that the Seeds may dry; after which, you should beat 'em out; and dry 'em again, and then preserve 'em for Use, being careful to hang 'em up where Mice and other Vermin can't come at 'em; for if they do, they will soon eat them up.

LACTUCA AGNINI; vide Valerianella.

LADY'S SLIPPER; vide Helleborine.

LADY'S SMOCK; vide Cardamine.

LAGOPUS; vide Trifolium.

LAMI-

LAMINATED, signifies *Plated*. Those Things are said to be *Laminated*, whose Con-texture discovers such a Disposition as that of *Plates* lying over one another.

LAMIUM, [takes its Name of the Fish *Lamia*, because it resembles the frightful Countenance of this Fish when it catches at any Thing. Some call it *Galeopsis*, of γαλήνη a *Cat*, because the Flower of it resembles the Countenance of a Cat when it offers to bite.] Archangel, or Dead-Nettle.

There are great Varieties of these Plants, which are preserv'd in curious Botanick Gardens, many of which grow wild in divers Parts of *England*: but being of little Beauty, they are rarely cultivated in any other Gardens; for which Reason, I shall not trouble the Reader with any farther Account of them.

LAMPSANA, [so call'd of λαμπρὸν to *evacuate*; because this Plant being eaten, it purges the Belly. It is also call'd *Herba Pappularis*, because it is very good for Chaps in Womens Nipples.] Nipple-wort.

This is also a very common Plant upon the Sides of dry Banks in most Parts of *England*.

LANIGEROUS TREES, are such as bear a Woolly or Downy Substance, as is commonly contain'd in the *Catkins* of the Willows, &c.

LANUGINOUS, signifies *Downy*, or to be cover'd with a soft Down, as a Quince.

LAPATHUM, [takes its Name of the Greek Word λαμπρὸν to *evacuate*, because the Root of this Plant purges the Belly: One Species of it is call'd *Hippolapathum*, of ἵππος an *Horse*; and λαμπρὸν, as much as to say *Great Lapathum*: and another is call'd *Patience*, of its gentle Virtue; and *Rhabarbarum Monachorum*, i. e. *Monks Rhubarb*.] The Dock.

The Characters are;

The Cup of the Flower consists of six Leaves, three of which are large, and of a red Colour; the other three are lesser, and green: In the Middle of the Cup are plac'd six Stamina: The three outer small Leaves of the Cup fall away when ripe; but the three inner large Leaves join together, and form a triangular Covering, in the Middle of which are contain'd shining three-corner'd Seeds.

There are great Varieties of these Plants, which are preserv'd in some Gardens, to increase the Number of their Plants: but as many of them are very common in *England*, and, if transplanted into a good Garden, and permitted to scatter their Seeds, do become very troublesome Weeds; so I shall only name two or three of the most valuable Sorts in this Place.

1. **LAPATHUM**; præstantissimum, *Rhabarbarum officinarum dictum*. Mor. Hist. The Pontick Rhubarb.

2. **LAPATHUM**; Alpinum, folio subrotundo. Mor. Hist. Round-leav'd Alpine Dock, by some call'd Monks Rhubarb.

3. **LAPATHUM**; hortense, folio oblongo, sive secundum Dioscoridis. C. B. P. Long-leav'd Garden Dock, or Patience.

The first of these Plants is by some suppos'd to be the true *Rhubarb*. But that does not appear, from the Figure and Consistence of the Roots, which in this Plant, however cultivated with us, is not of the same Colour; nor has it such a Resin as is found in the true; and the Shape of the Roots appear very different, as is also the Strength in Medicine: so that until the true Rhubarb is better known, there can little be said with Certainty on this Head.

The second Sort is sometimes cultivated in Gardens, for Medicinal Use; tho' there is a Dispute whether this be the true *Monks Rhubarb* or not: but there is no great Difference between the Roots of this Plant, and the other disputed Sort; so that either may be indifferently us'd.

The third Sort was formerly cultivated in Gardens as a Pot-herb; but of late Years it has been wholly disus'd for that Purpose, and now only preserv'd in Gardens for Medicinal Use.

These Plants are all easily propagated by sowing their Seeds in Autumn, soon after they are ripe, or early the succeeding Spring, in a rich, light, moist Soil, where they will grow to be very large, and, if singled out to the Distance of three Feet, will produce large strong Roots, which will be fit for Use the second Year after sowing; when they should be taken up soon after the Leaves are decay'd, and dry'd in a shady Place where the Air may freely pass between them.

LARIX, [so call'd, of λαρὶς sweet, because its Leaves send forth a sweet Savour.] The Larch Tree.

The Characters are;

The Leaves (which are long and narrow) are produc'd out of little Tubercles, in Form of a Painter's Pencil, (as in the Cedar of Libanus) but fall off in Winter. The Cones are small and oblong, and (for the most part) have a small Branch growing out of the Top; these are produc'd at remote Distances from the Male Flowers on the same Tree: The Male Flowers are (for the most part) produc'd on the under-side of the Branches, and, at their first Appearance, are very like small Cones.

The Species are;

1. **LARIX**; folio deciduo, conifera. J. B. The Larch Tree.

2. **LARIX**; folio deciduo, rudimentis Conorum candidissimis. Pluk. Alm. Larch Tree, with white Rudiments, or rather with white Male Flowers.

The first of these Trees is now pretty common in *English* Gardens: This is a Native of the Alps and Pyrenean Mountains, but thrives exceeding well here, especially if it be planted upon an elevated Situation; as may be observ'd by those which were planted a few Years since at *Wimbleton* in *Surrey*, which are now grown to be large Trees, and produce annually a large Quantity of Cones.

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The second Sort seems to be only a feminal Variety from the first, from which it differs in the Colour of the Male Flowers, which in this is White, but in the other of a bright Red Colour; as also in the Colour of the Leaves, which in this Sort are a somewhat lighter Green than those of the other; nor do the Trees of this Kind seem to be so vigorous: But whether the Seeds of this Kind will produce the same, I can't as yet say, having never seen any of the Plants which were rais'd from these Seeds produce any Flowers; but however, it may be obtain'd by Inarching it into the Common Sort.

These Trees are propagated by Seeds, which should be sown in the Beginning of *March*, upon a Bed of light Soil, expos'd only to the Morning Sun: Or otherwise, it may be sown in Pots or Boxes of light Earth, and plac'd under a Hedge where they may have the Morning Sun only. The Seeds should be cover'd about half an Inch thick with fine light Earth, and in very dry Weather should be gently refresh'd with Water. In about six Weeks, if your Seeds were good, the Plants will come up, at which Time you should carefully guard them against the rapacious Birds, who would otherwise pull off the Heads of the Plants, as they thrust themselves out of the Ground with their Covers on them; and observe to refresh them with Water in dry Weather, especially if they are sown in Pots or Boxes, as also to keep them constantly clear from Weeds, which, if suffer'd to grow among the young Plants, will soon destroy them: nor should they be too much expos'd to the Sun, or strong Winds, both which are very injurious to these Plants while they are young. But in *October* you should (if they are in Boxes or Pots) remove them into a Situation where they may be defended from sharp Winds, which are sometimes hurtful to 'em while young; but afterwards they will endure the severest Weather of our Climate.

The Latter-end of *March*, or Beginning of *April* following, you should remove these Plants into Beds of light fresh Earth, at about ten Inches Distance each Way, observing to water them, if the Season should prove dry, as also to lay a little Mulch upon the Surface of the Ground, to prevent the Sun and Winds from drying their Roots: In these Beds they may remain two Years, during which Time you should carefully keep them clear from Weeds; as also observe, if any of 'em incline their Heads downward, to thrust a small Stake into the Ground by such of them, and fasten their Heads upright thereto; for if they are suffer'd to grow on one-side while young, they are rarely to be reduc'd to an upright Figure again.

When the Plants have remain'd in these Beds two Years, they will be fit to transplant into the Nursery; in order to which, you should make choice of a Piece of fresh light Earth not over-dry, nor too wet: This Ground should be well dug, and cleans'd from Weeds, and Roots of Plants or Trees; and, after having laid it level, you should mark out the

Rows at three Feet Distance; then you should take up the Plants carefully, preserving a good Ball of Earth to their Roots, and plant them in the Lines at eighteen Inches asunder, observing to mulch their Roots, and also to water them, to preserve their Roots from drying. The best Season for this Work is toward the Latter-end of *March*, or Beginning of *April*, just before the Plants begin to shoot; for if they are remov'd sooner, they seldom succeed so well. During the Time they remain in this Nursery, they must constantly be kept clean from Weeds; and the Ground between them should be dug every *Spring*, that it may be loose for the Fibres of their Roots to strike into; and the Weeds will be hereby more effectually destroy'd than by any other Method: And the Roots of the Plants being annually cut round, will cause 'em to push out a greater Number of Fibres, whereby they will be much faster to remove than they would be if permitted to grow undisturb'd for several Years.

You must also observe to train their Heads upright, and not suffer them to grow awry, which they are naturally too much inclin'd to: But I would by no means advise the Sheering them into Pyramids, (as is too often practis'd), but rather lead 'em up for Timber Trees; for they will grow to a considerable Size, provided they like the Soil they are planted in.

In removing these Trees from the Nursery to the Places where they are design'd to be continu'd, you should always observe to do it just before they shoot out in the *Spring*, as also to take them up with a large Ball of Earth to their Roots; and when planted, the Ground should be mulch'd, and the Plants stak'd, to prevent the Wind from loosening them, or blowing 'em out of the Ground. These Directions, if duly executed, will be sufficient, and there will be no Danger of not succeeding. But the chief Cause why many of these Trees have fail'd, upon their being remov'd, was, the not doing it in a proper Season, or else that they were not carefully taken up.

These Trees are very proper for the Sides of barren Hills, where few other Sorts will thrive so well; and during the *Summer* they appear very beautiful; but in *Autumn* they cast their Leaves, whereby some People have been deceiv'd, by supposing 'em dead, and have destroy'd 'em.

From the wounded Bark of this Tree exudes the purest *Venice Turpentine*; and on the Body and Branches of it grows the *Agaric*, which is a Drug us'd in Medicine: And the Wood is very durable, and (by some) reported to be very difficult to burn. But I don't know how this should be, to a Tree which abounds with Turpentine; tho' it is said also to be so ponderous as to sink in Water. It will polish exceeding well, and is by the Architects abroad much coveted, both for Houses, and Building of Ships. *Wilsen*, a Dutch Writer upon *Naval Architecture*, mentions a Ship to be long since found in the *Numidian* Sea, twelve Fathoms under Water,

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being chiefly built of this *Timber*, and *Cypress*, both which Woods were reduc'd to that Hardness, as to resist the sharpest Tools; nor was any Part of it perish'd, tho' it had lain above a Thousand Years submerg'd. And it was upon Tables of this Wood that *Raphael* and several of the greatest Artists eterniz'd their Skill, before the Use of Canvas was introduced.

LARKSPUR; *vide Delphinium*.

LASERPITIUM, [takes its Name of *Lacerare*, Lat. to fear; because Incisions being made in the Stalks and Roots of this Plant, a Juice distils which is said to be *Affa fatida* and *Oposonax*. It is also call'd *Thus Libanotis*, because the Root of this Plant has the Smell of Frankincense.] Laser-wort.

This is a Kind of Umbelliferous Plant, of which there are several Sorts preserv'd in curious Botanick Gardens: but as they are Plants of little Beauty or Use in England, I shall omit mentioning them in this Place.

LATHYRUS; Chickling Vetch.

The Characters are;

It hath a papilionaceous Flower, out of whose Emplacement rises the Pointal, cover'd with a membranaceous Sheath, which afterwards becomes a Pod, sometimes round, sometimes cylindrical, and at other times angular; to which may be added, it hath a compress'd Stalk, with a rais'd Rib, and a leafy Border; and has only one Pair of Leaves, growing on the Nerves, which terminates in a Tendril.

The Species are;

1. **LATHYRUS**; *latifolius*. C. B. Broad-leav'd or Common Everlasting Peas.
2. **LATHYRUS**; *latifolius, minor, flore major*. Boerb. Ind. Lesser Broad-leav'd Everlasting Peas, with a larger Flower.
3. **LATHYRUS**; *major, Narbonensis, angustifolius*. C. B. Greater Narrow-leav'd Everlasting Peas.
4. **LATHYRUS**; *arvensis, repens, tuberosus*. C. B. Creeping Chickling, or Peas Earth-Nut, with a Tuberosé Root.
5. **LATHYRUS**; *Tingitanus, siliquis Orobi, flore amplo ruberrimo*. Mor. Hist. Tangier Chickling, with a large deep-red Flower.
6. **LATHYRUS**; *disloplatyphyllus, hirsutus, mellis, magno & peramano, flore odoro*. Hort. Cath. Broad-leav'd, hairy soft Chickling, with a large and very beautiful purple sweet-smelling Flower, commonly call'd Sweet-scented Peas.

There are several other Varieties of this Plant, which are preserv'd in curious Botanick Gardens as Curiosities; but these here mention'd being the most valu'd for their beautiful Flowers, I shall omit the others, as they are seldom cultivated for Use or Beauty.

The three first Sorts are abiding Plants, which send forth strong downright Roots very deep into the Earth; for which Reason they should not be often remov'd, which would prevent their growing strong, or producing many Flowers.

They are propagated by Seeds, which should be sown the Beginning of *March*, upon a Bed of light fresh Earth, covering them about half an Inch deep. But the best Method is, to make a shallow Drill in the Ground, and then drop the Seeds therein about six Inches Distance; these Drills should be a Foot asunder, for the Convenience of hoeing and cleaning the Ground between them; which must constantly be done, otherwise the Weeds will over-bear and destroy them: but they will require no farther Care, being very hardy Plants, until the *Spring* following, at which Time, (*viz.* in *March*) just before they begin to shoot, the Roots should be carefully taken up, and transplanted where they are to continue, placing them at least two Feet asunder, otherwise they will over-run each other, or whatever other Plants stand near them. If the Season should prove dry, you must give them some Water, to settle the Earth to their Roots; which should be now-and-then repeated, if it continue dry Weather, until the Plants have taken Root: after which, they'll require no farther Culture but to keep them clear from Weeds, and in the Summer-time to support them with strong Stakes, otherwise they'll trail upon the Ground and rot the Branches, and destroy whatever Plants grow near them.

These Plants are very proper to plant against a dead Hedge, where they will run over it, and if they be kept train'd up, will cover it in the Summer, and in such Places they will produce great Quantities of Flowers; but if they are planted in a Flower-Garden, they must have a great deal of Room, and in Summer should have very strong Stakes plac'd down by them, to which they must be closely fasten'd, otherwise they will ramble and trail upon the Ground, and appear very unsightly: for if the Ground be good in which they are planted, and the Roots are very strong, they will sometimes grow eight or ten Feet high in a Season, and produce abundance of Flowers, which are very ornamental in Basins or Pots of Flowers, to place in Chimnies or other Parts of large Rooms. These produce their Flowers in *June* and *July*, and their Seeds are perfected in *August*, their green Leaves decay in *Autumn*, and rise again the succeeding *Spring*, their Roots continuing good for many Years: They delight most in a light Soil, not too dry nor over wet, but will grow in almost any Soil or Situation, but best in that which is expos'd to the Sun.

The first Sort is most commonly cultivated in the *English* Gardens, but the second is much preferable to that, as being of humbler Growth, never rising above five Feet high, and so is more proper for Flower-Gardens, and the Flowers are much larger, and of a deeper red Colour, and commonly are produc'd in larger Clusters. The third Sort is seldom propagated in Flower-Gardens, tho' for Variety it should have a Place amongst other large Plants. The Flowers of this kind are smaller, and of a purple Colour.

The

The tuberoſe-rooted Sort is preserv'd as a Curioſity in many Gardens, tho' there is no great Beauty in its Flowers. This may be propagated either by Seeds, as the others, or by its Roots, which increaſe very faſt under-ground, and is an abiding Plant, but ſhould not be plac'd amongſt other curious Flowers, for the Roots propagating under-ground, will come up and ſpread over whatever Plants grow near them.

The fifth and ſixth Sorts are annual Plants, which are propagated only by Seeds: Theſe may be ſown in *March* in the Places where they are to remain for good, being Plants that ſeldom will grow if tranſplanted, except it be done while they are very young: Theſe ſhould be either ſown near a Pale, Wall, or Eſpalier, to which they may be train'd; or if ſown in the open Borders, ſhould have Stakes plac'd before them, to which they ſhould be faſten'd, otherwiſe they will trail upon the Ground and appear very unſightly, which is the only Culture theſe Plants require, except the clearing them from Weeds: They produce their Flowers in *July*, and their Seeds are perfected in *Auguſt* and *September*.

But the beſt Method to have them very ſtrong, is, to ſow their Seeds in *Auguſt*, under a warm Wall or Hedge, where they will come up in *Autumn*, and abide the Winter very well; and theſe will begin to flower in *May*, and continue to produce freſh Flowers until *July* or later, according to the Heat of the Season: and one of theſe autumnal Plants will be as large as four or five of thoſe ſown in the Spring, and produce ten times the Number of Flowers; and upon theſe Plants you'll always have good Seeds, when ſometimes the other will miſcarry: However, 'tis very proper to ſow their Seeds at two or three different Seasons, in order to continue their Flowers the longer, for the late planted ones will continue blowing until the Froſt prevents them.

The Sweet-scented ſort is the moſt valuable, both for the Beauty and Fragrancy of its Flowers.

LATIFOLIUS Trees and Plants are ſuch as have Broad Leaves.

LAVATERA, [takes its Name of the Phyſician *Helveticus Lavaterus* the Friend of *Monsieur Tournefort*; upon which Account, *Tournefort* ſo intitled it. *Vaillantius* thought it to be the *Trimeſtrei Cluſii*: but then it ought rather to be referr'd to the Genus of *Alcea*.]

The Characters are;

The Leaf, Flower, Style, and Cup of the Flower have the Appearance of a Mallow: The Stile becomes a Fruit which is arm'd in Front with a hollow Shield: The Seeds, which are ſhap'd like a Kidney, growing to the inner Part.

The Species are;

1. **LAVATERA**; folio & facie *Althææ*. *Tourn.* *Lavatera*, with the Leaf and Face of *Marsh-mallow*.

2. **LAVATERA**; folio & facie *Althææ*, flore albo. *Lavatera*, with the Leaf and Face of *Marsh-mallow*, and a white Flower.

3. **LAVATERA**; *Africana*, flore pulcherrimo. *Boerb. Ind.* *African Lavatera*, with a moſt beautiful Flower.

Theſe are all Annual Plants, which are propagated by Seeds: The Season for ſowing 'em is in *March*, upon a Bed of freſh light Earth; and when the Plants are come up, you muſt carefully clear them from Weeds; and in very dry Weather they muſt be now-and-then reſreſh'd with Water. When they are about two Inches high, you muſt tranſplant them into the Places where they are deſign'd to remain, which ſhould be in the Middle of the Borders in the Flower-Garden, for if the Soil be good, they will grow two or three Feet high: In tranſplanting them, you muſt take 'em up very carefully, preſerving a Ball of Earth to their Roots, otherwiſe they are apt to miſcarry: And alſo water and ſhade them until they have taken Root; after which they will require no other Care but to clear them from Weeds, and to faſten them to Stakes to prevent their being injur'd by ſtrong Winds. You may alſo ſow their Seeds in *Autumn*; and when the Plants are come up, you ſhould tranſplant them into ſmall Pots, which, towards the End of *October* ſhould be plac'd into a common Hot-bed Frame, where the Plants being defended from ſevere Froſts, will abide the Winter very well; and in the Spring you may ſhake them out of the Pots, and plant them into larger, or elſe into the full Ground, where they may remain to flower: The Plants thus manag'd, will be larger, and flower ſtronger and earlier than thoſe ſown in the Spring, and from theſe you will conſtantly have good Seeds; whereas thoſe ſown in the Spring do ſometimes miſcarry.

Theſe produce their Flowers in *June*, *July* and *Auguſt*, and their Seeds ripen ſoon after.

They are very ornamental Plants in a fine Garden, when plac'd among other Annuals, either in Pots or Borders; their Flowers are very like thoſe of the *Mallow*, but are larger and of a more beautiful Colour.

LAVENDULA, [takes its Name of *Lavando*, Lat. *washing*, becauſe it was us'd to be thrown into Baths for the Fragrancy of the Scent; or becauſe us'd in Lye to give a Fragrancy to Linen; and becauſe it is very good to waſh the Face with, and give it both Beauty and a grateful Scent.] *Lavender*.

The Characters are;

It is one of the verticillate Plants, whoſe Flower conſiſts of one Leaf, which is divided into two Lips; the Upper-lip ſtanding upright, is roundiſh, and for the moſt part biſid; but the Under-lip is cut into three Segments, which are almoſt equal: Theſe Flowers are dispos'd in Whorles, and are collected into a ſlender Spike upon the Top of the Stalks.

The Species are;

1. **LAVENDULA**; latifolia. C. B. Common broad-leav'd *Lavender*.

2. **LAVEN-**

2. *LAVENDULA*; *angustifolia*. C. B. Common narrow-leav'd Lavender, commonly call'd Spike Lavender.

3. *LAVENDULA*; *latifolia, sterilis*. Mort. Hist. Broad-leav'd barren Lavender.

4. *LAVENDULA*; *angustifolia, flore albo*. C. B. P. Narrow-leav'd Lavender, with white Flowers.

5. *LAVENDULA*; *folio dissecto*. C. B. Cut-leav'd Lavender.

6. *LAVENDULA*; *folio dissecto, flore albo*. Boerb. Ind. Cut-leav'd Lavender, with a white Flower.

7. *LAVENDULA*; *folio longiori tenuius & elegantius dissecto*. Tourn. Lavender, with a longer and more beautiful fine cut Leaf, commonly call'd, Canary Lavender.

The first of these *Species*, tho' very common in most Parts of *Europe*, yet in *England* is rarely to be found, notwithstanding it is as easily propagated as any of the other Sorts.

The second is the most common Sort in the *English* Gardens, being propagated for medicinal Uses, &c.

The third Sort is a Degeneracy from the second, having much broader and greener Leaves, but rarely ever flowers while it continues with the Leaves broad; but whenever it flowers, the Leaves of that Part of the Plant become narrow again.

The fourth Sort is also a Variety of the second, from which it differs in the Colour of the Flowers, which in this Sort are white, and those of the second are blue.

These are all propagated by Cuttings or Slips; the best Season for which is in *April*, when you should plant them in a shady Situation, or at least shade them with Mats until they have taken Root; after which they may be expos'd to the Sun, and when they have obtain'd Strength, may be remov'd to the Places where they are design'd to remain: These Plants will abide the longest in a dry, gravelly, or stony Soil, in which they will endure our severest Winters, tho' they will grow much faster in the Summer, if they are planted upon a rich, light, moist Soil, but then they are generally destroy'd in Winter; nor are the Plants half so strong scented, or fit for Medicinal Uses as those which grow upon the most barren, rocky Soil.

The first and second Sorts may also be propagated from Seeds, which should be sown in *March* upon a dry undung'd Soil; and when the Plants are come up, they must be carefully clear'd from Weeds, until they are about two Inches high, when they should be transplanted into other Beds, allowing them a Foot Distance each Way: In these Beds they may remain, to be cut for Use; or you may afterwards transplant them into dry Borders or Beds, in any other Place where you would have them stand, observing never to dung the Ground where they are planted, which would cause them to grow vigorously in Summer, but will hasten their Decay, as was before observ'd.

These Plants were formerly in use to make Edgings to Borders in Gardens; for which

Purpose they are by no means proper, for they will grow too large for such Designs; and if they are often cut in very dry Weather they are subject to decay, and in hard Winters they are very often kill'd, so that the Edging will not be compleat; besides, these Plants do greatly exhaust the Goodness of the Soil, whereby the Plants in the Borders will be depriv'd of their Nourishment; so that they should never be planted in a fine Garden amongst other choice Plants or Flowers, but rather be plac'd in Beds in the Physick-Garden: These Plants produce their Flowers in *June* and *July*, as which time they should be gather'd and dry'd in a shady Place, and preserv'd dry for Use.

The fifth, sixth, and seventh Sorts are commonly sown every *Spring*, on Borders or Beds of light, fresh Earth; and when the Plants come up, they may be transplanted into other Borders of the Flower-Garden, or into Pots, to remain for good, where they will produce their Flowers in *July* and *August*, and their Seeds are ripe soon after. These are pretty Plants to place in large Borders amongst other Plants for Variety, but they are never us'd with us: They may also be preserv'd over the Winter, if plac'd into a Green-house in *Autumn*, which is the surest Method to obtain good Seeds from the seventh Sort, which rarely ripens Seeds the first Year; but they seldom continue longer than two Years with us, and many times (if they have produc'd Seeds the first Year) they will not continue longer. These Plants will sometimes grow from Cuttings, but then the Cuttings must be strong and inclinable to be woody, for if they are very soft and spongy, they seldom succeed; and they should also be plac'd upon a moderate Hot-bed, which will greatly promote their taking Root. This Method is sometimes necessary to preserve the Sorts which might otherwise be in Danger of being lost.

LAUREOLA; vide *Thymelea*.

LAUROCERASUS; [this Plant is thus call'd, because it has the Flowers of the *Laurel*, and the Fruit of a *Cherry*.] The *Laurel* or *Cherry-Bay*.

The Characters are;

It hath broad, thick, shining, ever-green Leaves, somewhat like those of the *Bay-Tree*: The Cup of the Flower is hollow and Funnel-shap'd, spreading open at the Top, and is divided into five Parts: The Flower consists of five Leaves, which expand in Form of a Rose, having many Stamina in the Center: The Fruit (which are like those of the *Cherry-Tree*) are produc'd in Bunches, and the Stone is longer and narrower than that of the *Cherry*.

The Species are;

1. *LAUROCERASUS*; *Clus. Hist.* The common *Laurel* or *Cherry-Bay*.

2. *LAUROCERASUS*; *foliis ex albo variegatis*. Cat. Plant. Angl. The White-strip'd *Laurel*.

3. *LAUROCERASUS*; *foliis ex luteo variegatis*. Cat. Plant. Angl. The Yellow-strip'd *Laurel*.

4. *LAURO-*

4. **LAUROCERASUS**; *Lusitanica*, *minor*. *Tourn.* The Dwarf Portugal Laurel, call'd Afarero.

The first Sort is very common in most *English* Gardens, and was formerly in greater Request than it is at present, when these Trees were planted against North-walls to cover them; as also in the Parterre-Garden, where they were frequently sheer'd up to form Pyramids and Globes, for which Purpose, this was one of the most improper Trees; for the Leaves being very large, they were cut in divers Places by the Sheers, which render'd them un-fightly: But though this Plant is very improper for such Uses, yet it is valuable for planting upon the Sides of cold barren Hills, where it will grow to a large Magnitude, and make a fine Appearance through the whole Year, and in such Situations it will rise to a large Tree.

They are easily propagated by planting Cuttings in *July*, in a shady, moist Border, where they will soon take Root; and in the *Spring* following may be remov'd into the Nursery, planting them three Feet distance Row from Row, and two Feet asunder in the Rows, observing to clear them from Weeds, and to dig the Ground annually between the Rows, and prune off their under Branches, to make them aspire in Height; and when they have remain'd in this Place three Years, they will be fit to transplant into the Places where they are to continue. The best Season for transplanting these Trees is in *April*, just before they begin to shoot; but in taking them up, you must always observe to preserve a Ball of Earth to their Roots: and when they are planted, you must mulch the Ground round their Stems to preserve it from drying, and refresh them often with Water (especially if the Season be dry) until they have taken Root, after which, they will require but very little Culture.

But if you design these Trees for large Standards, the best Method is to propagate them from the Berries, which will easily rise, and will sooner grow to large Trees than those propagated by Cuttings. The Manner of sowing these Seeds is as follows; You should dig and prepare a Bed or two, (according to the Quantity of Seeds you have to sow) and level the Ground very even; then sow the Berries thereon soon after they are ripe, covering them over about an Inch thick with light Earth: In the *Spring* the young Plants will appear; at which time you must carefully clear them from Weeds, and in dry Weather often refresh them with Water, which will greatly promote their Growth: these Plants (if they have made a good Progress) will be fit to transplant the succeeding *Spring*; when you must prepare some fresh Beds, into which they should be remov'd, planting them ten Inches or a Foot asunder each way, observing to water them, and lay a little Mulch about their Roots: In these Beds they may continue two Years; after which they should be remov'd either into the Places where they are to remain, or in a Nursery, as was before directed.

There are some People, who advise the Budding of this Tree upon the common Black-Cherry-Stock, in order to render it more vigorous; but as I have never yet seen any large Trees which were thus rais'd, so I can't say how well it will succeed, though I have often seen the *Cherry* grafted on this Tree, and this grafted upon the *Cherry*, both which have taken very well; but I much doubt whether they will join so well together as to add to the Stature of the Tree, especially since we find that most Sorts of Fruit-Trees grow much larger when they are suffer'd to remain ungrafted as they come from Seeds, than those which are budded or grafted.

The Berries of this Tree are by some put into Brandy to make Ratafia, for which Purpose it is greatly prefer'd to *Apricock* Stones, giving the Brandy a much pleasanter bitter Taste, and by some the Leaves are us'd for the same Purpose; but this should be cautiously done, since, by some late Accounts from *Ireland*, we are inform'd, that the distill'd Water of these Leaves is found to be poisonous. Whether this Account be true or not, a few Experiments will soon make appear.

These Berries are much coveted by divers sorts of Birds, for which Reason some of the Trees should be planted in the Clumps, where you intend a Shelter for Birds to harbour, and their Leaves remaining always green, will be of great Use to these Inhabitants in Winter; so that such Plantations will be well stor'd with *Black-birds*, *Thrushes*, and many other Sorts of Singing-Birds, to the no small Pleasure of such Places.

The two variegated Kinds may be propagated by Cuttings, or by budding or grafting them on the plain Sort; but these must constantly be planted on a poor Soil, otherwise they will become plain again. These are pretty Varieties amongst other variegated Plants.

The *Portugal Dwarf Laurel* is somewhat tenderer than the common Sort, and is subject to be injur'd by severe Frosts, but will endure our ordinary Winters abroad very well. This is propagated in the same manner as the common sort, but will not grow near so large; however, it is very proper to intermix with Ever-greens of middling Growth, where, if it be planted on a dry Soil, and has a warm Situation, it will stand the Test of our Winters very well.

LAURUS; The Bay-Tree.

The Characters are;

It hath a Flower consisting of one Leaf, which is shap'd like a Tunnel, and divided into four or five Segments; the Male Flowers, which are produc'd on separate Trees from the Female) have eight Stamina, which are branched into Arms; the Ovary of the Female Flowers becomes a Berry, inclosing a single Seed within a horny Shell, which is cover'd with a Skin.

The Species are;

1. **LAURUS**; *vulgaris*. C. B. The common Bay, with Male Flowers.
2. **LAURUS**; *vulgaris*, *Femina*. Boerb. Ind. The common Fruit-bearing Bay Tree.

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3. **LAURUS**;

3. LAURUS; *vulgaris, folio elegantissime variegato aureo.* Boerb. Ind. The Gold-strip'd Bay-Tree; *vulgó.*

4. LAURUS; *vulgaris, folio undulato.* H. R. Patr. The Common Bay-Tree, with waved Leaves, and Male Flowers.

5. LAURUS; *vulgaris folio undulato, fæmina.* Boerb. Ind. The Berry-bearing Bay-Tree, with waved Leaves.

6. LAURUS; *tenuifolia.* Tab. Icon. Mas. The Narrow-leav'd Bay, with Male Flowers.

7. LAURUS *tenuifolia, fæmina.* Boerb. Ind. The Narrow-leav'd Berry-bearing Bay-Tree.

8. LAURUS; *latiori folio.* Lugd. Mas. The Broad-leav'd Bay-Tree, with Male Flowers.

9. LAURUS; *latifolia, fæmina.* Boerb. Ind. The Broad-leav'd Berry-bearing Bay-Tree.

10. LAURUS; *Indica.* Hort. Farnes. Ald. The Broad-leav'd Indian Bay-Tree, commonly call'd Wild Cinnamon.

The first and second Sorts are old Inhabitants of the *English* Gardens; and as they are Varieties obtained from the said Seeds, so they are promiscuously cultivated, and are not to be distinguished asunder until they have produc'd Flowers.

These Plants are propagated either from Seeds, or by laying down the tender Branches, which will take Root in one Year's Time, and may then be taken off, and transplanted either into a Nursery, or the Places where they are design'd to remain. But if you would propagate them from Seeds, you must gather them from the Trees in *January*, (at which Time they commonly are ripe), and preserve them in Sand until the Beginning of *March*, when you must prepare a Bed of light dry Earth, which should be situated in a warm Place where the Plants may be defended from the North and East Winds: This Bed must be levell'd exactly even, and then draw some small Furrows cross it at about eight Inches Distance, and an Inch deep, into which you should drop the Seeds about two Inches asunder, then cover them with Earth; and if the Season should prove very dry, you must often refresh them with Water. In about two Months Time the young Plants will appear above-ground, when you must carefully clear them from Weeds; and in dry Weather if you refresh them with Water, it will greatly promote their Growth: In these Beds they should continue two Years, by which Time they will be large enough to transplant; you must therefore make choice of a warm dry Spot of Ground, which should be well dug and cleans'd from Weeds and Roots of Trees, &c. and laid even; then mark out the Lines three Feet distant from each other; and having taken up the Plants carefully with a Ball of Earth to their Roots, you must plant them exactly strait in the Rows, at eighteen Inches asunder, observing to water them well, as also to lay some Mulch upon the Surface of the Ground, near the Stems, to preserve the Ground from drying too fast. The best Season for Removing these Trees is in *April*, just before they begin to shoot.

During the Time these Plants remain in the Nursery, you must observe to keep them clear from Weeds, digging the Ground between the Rows every *Spring*; as also to fasten the Shoots of the Plants to strait Stakes, to prevent their growing crooked and unsightly; and also observe to prune off the Under-shoots, to make them advance in Height: But I can by no means recommend the sheering of these Plants into conical or pyramidal Figures, (as is the general Practice), for the same Reason as I gave for the *Laurel*, viz. that the Leaves being large, are cut in Pieces, whereby the Plants are render'd very unsightly; but rather, that they should be improved, so as to make large Trees, to which they are naturally dispos'd to grow, could we prevent the Sheers from perpetually gnawing them.

These Trees are very proper to plant upon the warm Sides of dry Hills, where they may be protected from the severe Blasts of the North and East Winds; in which Situations I have seen some of these Trees upward of thirty Feet in Height, which is a plain Indication of their large Growth.

But I know it will be objected, that these Trees are often destroy'd by hard Winters, and so are improper to make large Plantations of in *England*. That they have been sometimes kill'd by severe Winters, I can't deny: but if they are brought up thus hardily, as has been directed, and not sheer'd, I dare affirm they will resist the severest Cold of our Climate, when grown to a moderate Age, provided they are planted in a dry Soil, in which tho' their Leaves should be entirely shrivell'd by extreme Cold, yet, if permitted to remain undisturb'd, they will shoot again in the succeeding Summer, as I have more than once experienc'd. And in the hard Winter, *Anno* 1728, when most of the *Bay-Trees* seem'd to be destroy'd which grew abroad, and many People were so inconsiderate as to dig them up and throw them away, it was observable, that all those which were permitted to stand, did shoot out again in the succeeding Summer, and recover'd their usual Verdure. Which should caution every Person, not to be over-hasty in condemning Trees to the Fire, but to wait for the Success of a whole Season, before they are pull'd up.

Bay-Leaves dry'd and reduc'd to Powder, as much as will cover an Half-Crown, being drank in a Glass of White-Wine, are said seldom to fail of curing an Ague: These Leaves are also used in divers Sauces in the Kitchen, and the Berries are often used in Medicine.

The Gold-strip'd *Bay* is much more tender than the common Sort; for which Reason it must be planted in Pots, and hous'd in Winter with *Oranges*, *Myrtles*, &c. and must be plac'd so as to have as much free Air in mild Weather as possible, and will require to be frequently water'd. This Plant may be propagated by Layers, or by Budding it upon the Common *Bay*: but you must not plant it into very rich Earth, which will cause it to grow vigorously, whereby it will become quite

quite plain; but, on the contrary, let it have a fresh light sandy Soil, in which it will very well preserve its beautiful Stripe.

The 4th, 5th, 6th, 7th, 8th, and 9th Sorts are commonly preserv'd in Pots or Tubs, and plac'd in the Green-house with *Oranges*, *Myrtles*, &c. But I dare say, either of these Sorts will thrive in the open Air, if planted in a warm dry Soil, and defended from the North and East Winds; but especially the Broad-leav'd Sort, which, I have experienc'd, will endure more Cold than the Common *Bay*. But as they are less common, so they are generally preserv'd with more Care; tho' they may either of them be propagated in as great Plenty as the common Sort, either by Layers, or Seeds; for they will bear great Plenty of Berries, provided they are not kept sheer'd; and these Berries will rise full as well, and, many times, out-grow the Common *Bay*, as I have frequently observ'd: so that why we have not these Trees in as great Plenty as the common Sort, is only owing to their not being propagated and planted abroad; most People imagining, because they have been hitherto treated with great Care, that therefore they will not endure the Cold. Which is a great Mistake; for we have found, by repeated Trials which have been made within a few Years past, that many of those Plants which had been nurs'd up in Green-houses, with great Care (whereby their Roots were confin'd, and the Plants circumscrib'd and starv'd in their Growth) when planted abroad, have made great Progress, and defy'd the most severe Cold of our Climate to injure them: Which is a great Encouragement to proceed in our Trials of this Kind; since, by this Method, we may naturalize a great Variety of valuable Trees and Plants to our Country, which may hereafter be found of great Benefit. Nor should we be discourag'd, if, in the first Attempt, we should not succeed so well as we might wish; for, by several Essays, we may overcome the Difficulty; and then the Pleasure of having Denizen'd any Exotick Trees, will sufficiently compensate the Trouble, since hereby we establish living Monuments of Praise.

The *Indian Bay* is too tender to endure our Cold Winters abroad as yet: Though I doubt not but that when these Plants are very strong and woody, and some Care taken in their first Exposure, they may be brought to thrive in the open Air; which, if once obtain'd, so as to have Seeds produc'd in *England*, the Off-spring will be better inured to our Climate. And if this Plant can be once well naturalized, so as to grow as in the warmer Parts of *Europe*, it will be one of the noblest Ever-greens, for Shade and Beauty, we ever obtain'd; for it is naturally a very strait-growing Tree, and the Leaves are very broad, and of a shining green Colour, which renders it very agreeable.

This Plant is propagated by Seeds, (which are easily procur'd from *Portugal*, where these Trees grow in great Plenty; they should be put into Pots fill'd with fresh light Earth, and plung'd into a gentle Hot-bed, to facili-

tate their Growth; and when the Plants are come up, you should remove the Pots into another moderate Hot-bed, to forward them, where they should remain until the Beginning of *June*, when you must harden them by degrees, to endure the open Air, into which they should be remov'd about the Middle of that Month, observing to place the Pots in a well-shelter'd Situation, and in dry Weather you must often refresh them with Water. The Beginning of *October* you must remove the Pots into the Green-house, placing them near the Windows, that the Plants may have as much free Air as possible in mild Weather; and observe that they do not suffer with Drought, for they will require to be frequently refresh'd with Water. In *April* following you must take the Plants out of the Pots, preserving the Earth to their Roots, and put each into a separate Pot fill'd with the before-mention'd fresh light Earth: Then plunge them into a moderate Hot-bed for a Month or six Weeks, to hasten their taken Root; which done, you must harden them again, and expose them to the open Air, as before: And in Winter they must be hous'd again, observing the Directions before given. After five or six Years thus managing them, (still observing every Year to let them continue longer out of the House in *Autumn*, than the preceding), you should in *April* plant some of them into the full Ground, in a warm well-shelter'd Situation, that they may have good Rooting in the Ground before the Winter comes on: And in *Autumn* you must lay a little Mulch upon the Surface of the Ground, to prevent the Frost from penetrating to their Roots. But if the Winter following should prove severe; you should twist a Band of Hay or Straw round their Stems, which will be of great Service to protect them from Cold: And after they have endured two or three Winters abroad, they will be pretty much out of Danger; for tho' a very hard Winter may afterwards kill some of their Branches, yet they will shoot again the following Summer.

LAURUS ALEXANDRINA; *vide* Ruscus.

LAURUS TINUS; *vide* Tinus.

LAWN, is a great Plain in a Park, or a spacious Plain adjoining to a noble Seat.

As to the Dimensions of it, it should be as large as the Ground will permit; but never less, if possible, than fifty Acres.

As to the Situation of a *Lawn*, it will be best to be in the Front of the House, and to lie open to the neighbouring Country, and not pent up with Trees.


If the House front the *East*, it will be most convenient, because the Rooms will be shaded in the Afternoon, and so the Objects to be view'd from the House will be much beautify'd by the Sun's shining upon them in the Afternoon: For if the best Room of the House front the *Lawn*, as it always should do, the Afternoon being the most usual Time for People

People of Fashion to solace themselves in such Rooms, then the Afternoon Sun will not be offensive to those Rooms; nor will the Prospect be interrupted, but render'd more pleasant: whereas, were it on the *West* Side of the House, the Sun, by shining from the Object, and directly against those Rooms, would by both hinder the Prospect; and the Generality of Prospects are most pleasant when the Sun shines upon them.

Besides, there is another Inconveniency; if the *Lawn* be on the *West* Side of the House, it will give the more Way to the *West* Wind (which is commonly the greatest) to injure the House, by its having a free Passage to it.

If the *Lawn* be on the *South* Side of the House, it may do well enough, for the Reasons before mention'd; for the Sun's Rays being then darted obliquely, will not much interrupt the Prospect; and the Sun shining most part of the Day on that Side of the House, will still add to the Beauty of that Front, which ought to be the best Front in the House; therefore a *Lawn* on that Side will much help the Prospect of the House.

It will not be at all convenient to have the *Lawn* on the *North* Side of the House, because it will lay the House too open to the Cold North Winds, &c. therefore it will be more eligible to plant Wildernesses and Woods on the *West* and *North* Sides of the House.

If the Figure of the House be built in this Form, , or any other, the Front may be on both Sides the House alike, making an Angle at the Middle of the Front, or at some Court Gate right before it, and breaking off at a convenient Distance from the House.

As to the Figure of a *Lawn*, the Square is a very proper one, and if it be bounded with Walks it may not be much amiss, though I rather recommend an open *Lawn*; but if Persons chuse to have it bounded, a single Row of Lime Trees set at a good Distance one from another, will not look amiss, and being so placed, they will the better shew the Shape of their Heads; but however, the Front of the *Lawn* should be left open, except the *Lawn* fall very much from the House.

If Persons will, there may be three Avenues breaking out at three Angles; or one at the Angle opposite to the House, and if the *Lawn* be a rising Ground to the House, some Trees set thin upon it will not look unpleasant. If the *Lawn* be a Circle, it may not be amiss; but then it ought to break off before it comes against the Front.

Neither is a Triangle a very improper Figure for a *Lawn*, but if so, the Angle which leads to the Front must not be too acute; but it should rather be obtuse or right-angled, at the Angle that is next to the Front.

If the *Lawn* be bounded with Trees, Lime Trees are very proper for that Purpose, because they are Trees that will grow well in any Soil, if Care be taken in the Planting of them; and besides that, all the Trees will grow in a very fine Shape, appearing as though they were cut, if they are not too thick planted, and you will have a Prospect of the adjoining

Country between their Stems, especially if their Heads are pruned up to a reasonable Height; but if that Part of the Country upon which you look is not agreeable, then you should bound the View with a rising Plantation of Trees, formed into an Amphitheatre, which will be very agreeable.

The *Elm* is a very proper Tree for planting of *Lawns*, having a fine green Leaf, and if the Ground be natural to it, it will grow to a large Tree and strait, if it be still kept pruned as it ought to be.

The *Beech* makes a stately Tree where it likes the Ground, also the *Chestnut*, the *Walnut* and the *Black-Cherry* Tree, for where they like the Ground, they are not only quick Growers, but represent a very delightful Scene in the Spring, when cloath'd in their white Attire.

Firs and *Pines* do very well, if the Ground be suitable to them, and these being always Green, afford a constant Pleasure both in Winter and Summer.

LAYERS: Many Trees may be propagated by *Layers*, the Ever-greens about *Bartholomew-tide*, and other Trees about the Month of *February*.

This is to be performed by flitting the Branches a little way, and laying them under the Mould about half a Foot; the Ground should first be made very light, and after they are laid, they should have a little Water given them.

If they do not comply well in the laying of them down, they must be pegg'd down with a Hook or two, and if they have taken sufficient Root by the next Winter, they must be cut off from the main Plants, and planted in the Seminary, as is directed about Seedlings.

Some twist the Branch or bare the Rind, and if it be out of the Reach of the Ground, they fasten a Tub or Basket near the Branch, which they fill with good Mould, and lay the Branch in it.

Laying of Trees.

This Operation is thus performed.

1st, Take some of the Boughs and lay them into the Ground about half a Foot deep in fine fresh Mould, leaving them with the End of the *Layer* about a Foot, or Foot and a Half out of the Ground, and keep them moist during the Summer-season; and they will probably have taken, and be fit to remove: and if they have not by that time taken Root, they must lie longer.

2dly, Tie a Piece of Wire hard round the Bark of the Bough, at the Place you intend to lay in the Ground, and twist the Ends of the Wire, so that they may not untie, and prick the Place above the Wire through the Bark with an Awl in several Places, and then lay it into the Ground, as before directed.

3dly, Cut a Slit upwards at a Joint, as is practised in laying of *Carnations*, which by Gardeners is called *Tonguing the Layers*.

4thly,

w

4thly, Twist the Place that you design to lay in the Ground like a Withy, and lay it into the Ground as directed in the first Way of Laying.

5thly, Cut a Place round about the Bough (that is design'd to be laid) an Inch or two, at the Place that is most convenient to lay into the Ground, and manage it as is directed in the first Method of Laying.

The Season for laying Hardy Trees that shed their Leaves, is in *October*; but for such as are tender, in *March*, for Ever-greens, *June* or *August* are good Seasons.

Though *Layers* may be laid at any Time in the Year, yet those Seasons before-mentioned are most proper, for the Reasons following; because they have the whole Winter and Summer to prepare and draw Root; for at these Times of the Year the Sun has sufficient Power on the Sap of the Tree to feed the *Leaf* and *Bud*; but has not Power sufficient to make a Shoot.

And if that small Quantity of Sap that does arise be hindered, as it will by some of the preceding Ways of Laying, the *Leaves* and *Buds* will gently crave of the *Layer*, and by that Means will prepare the *Layer* to take Root, or put forth Roots a little to maintain itself, finding it cannot have it from the Mother-Plant.

And therefore, because it wants but little Nourishment at that Time of the Year, it is better to lay *Layers* of Trees, or to set *Cuttings*, than at other Times, either in the Winter when the Sap stirs but little, or in the Summer when the Sap abounds, or in the Spring when it begins to rise, because it is then apt to come too suddenly to draw Sap from the *Layer*, before the *Layer* has drawn or prepared for Root.

However the *Spring* or *Summer* may do well for small Plants, because such Plants being but short-liv'd, draw Root the quicker.

If you would lay young Trees from an high Standard, the Boughs of which cannot be bent down to the Ground, then you must make use of Ozier-Baskets, Boxes or Pots, filled with fine sifted Mould, mix'd with a little rotten Willow-dust, which will keep Moisture to assist the *Layer* in taking Root: This Basket, Box, &c. must be set upon a Post or Tressel, &c. and the Bough must be laid according to either of the four first Ways of Laying; but too much Head must not be left on, lest that be injured by the Wind, or by its own Motion rub off the tender Root; and the smaller the Boughs are, the less Way they should be set out of the Ground, and Care must be taken to keep them clear from Weeds.

The harder the Wood is, the better will the young Wood take Root; but if the Wood be soft, the older Boughs will take Root the best.

LEAVES are defined to be a Part of a Plant extended into Length and Breadth, in such a Manner as to have one Side distinguishable from the other; they are properly the most extreme Part of a Branch, and the Or-

nament of the Twigs, and consist of a very glutinous Matter, being furnished every where with Veins and Nerves, one of their Offices is to subtilize and give more Spirit to the Abundance of nourishing Sap, and to convey it to the little Buds.

A *Simple Leaf*, is that which is not divided to the Middle.

A *Compound Leaf* is divided into several Parts, each resembling a simple *Leaf*, as in *Liquorice*, &c.

A *digitated Leaf* is a compound *Leaf* divided into several Parts, all of which meet together at the Tail, as in the *Hemp*, *Black Heilebore*, &c.

A *Trifoliated Leaf*, is a digitated *Leaf*, consisting of three Fingers, as the *Trefoil*, &c.

A *Quinquefoliated Leaf*, is a digitated *Leaf*, consisting of five Fingers, as in the *Quinquefolium*.

A *Pennated Leaf*, is a compound *Leaf* divided into several Parts (each of which is called a *Lobe*) placed along the middle Rib, either alternately, or by Pairs. When the middle Rib is terminated by an odd *Lobe*, it is said to be *unequally Pennated*; as in the *Goats Rue*, &c. and *equally Pennated*, when it is not terminated by an odd *Lobe*, as in the *Cassia*, when the Lobes are all nearly of the same Form and Bigness, it is called an *uniform pennated Leaf*, as in the *Liquorice*; when they are not so, it is said to be *Difform*, as in the *Agrimonia*.

A *winged Leaf* is, as it were, divided into several *pennated Leaves*, as in the *Orobis*, &c.

A *Ramose Leaf* is that which is still farther divided than the *winged Leaf*, as in the *Osmund Royal*, *Female Fern*, &c.

An *intire Leaf* or *Lobe*, is that which has no Division on its Edges, as in the *Apple Tree*, &c.

A *sinuated Leaf* is that which is cut about the Edges into several long Segments, as in *Common Mallow*.

A *Serrated Leaf* is that which is cut about the Edges into several *acute Segments*, resembling the Teeth of a *Saw*, as in the *Nettle*, &c.

A *Crenated Leaf* is that which is cut about the Edges into several *obtus Segments*, as in the *Betony*, &c.

A *Laciniated* or *Jagged Leaf* is that which is cut about the Edges into several pretty deep Portions, in an irregular manner, as in the *Horned Poppy*, &c.

Leaves are a Part of a Plant that is ordinarily very thin and flat, growing in the *Spring*, and falling off at the *Autumn*; tho' there are some Plants without *Leaves*, as the *Truffles* and *Mushrooms*.

As to the Structures of *Leaves*, Dr. Grew observes, That their Fibres never stand on the Stalk in an even Line, but always in an angular or circular Posture; and their Vascular Fibres or Threads are three, five, or seven: The Reason of which Position, is for the more erect Growth and greater Strength of the *Leaf*.

Another Observable in the Fibres of *Leaves*, is, their orderly Position, so as to take in an Eighth Part of a Circle, as in *Mallows*; in some a tenth, and in most a twelfth Part.

X x x x

Dr. Grew

Dr. Grew also observes six several Parts intended by Nature for the Preservation of *Gems*, viz. *Leaves*, *Sunfoils*, *Interfoils*, *Stalks* of *Leaves*, *Hoods* and *Mantlings* that cover them.

The Skin or Coat of the *Leaves*, is no more than that of their Branches extended; as Gold, by beating, is reduc'd to *Leaves*: In the Gem they are folded, and sometimes in several Plaits, somewhat after the manner of a Fan. If the *Leaves* are too thick to plait commodiously in two, and to be rang'd against each other, or if they be in too small a Number, and their Fibres too delicate; instead of being plaited, they are roll'd up, and form either a single Roll, as the *Leaves* of the *Mountain Cowslip*, which are thick, or two Rolls, which begin at each Extremity of the Leaf, and meet in the Middle.

There are some Plants whose *Leaves* form three Rolls, as *Fern*, &c. Several *Leaves* are cover'd with Hair of several Figures; those of *Lavender* and the wild *Olive Tree* have Hairs resembling Stars.

The Use of *Leaves*, is to cover the Flowers and Fruits with their Shade, and to keep them from other Inconveniences; and they serve also for Ornament, to make the Tree look pleasant to the Sight, and are to Trees, as Hair is to Human Bodies.

Some compare the *Leaves* of Plants, that first explain themselves to the *Placenta* in Animals, and are as the Coats of the little Buds.

The Foot-stalks of the *Leaves*, by which the nourishing Sap is convey'd to them, and divides it self into the Sinuosities or Circuits, which are found throughout the whole Structure; by means of which, the nourishing Juice is refin'd, and, in part, may receive the most spirituous Particles of the Air.

Some have observ'd, that if the *Leaves* that are adjoyning to the Bud are destroy'd, it will shoot no more, 'till fresh *Leaves* come forth again to succour it; for in this Case, the *Leaves* do the same Office which the *Ear-leaves* do to the Gem in its first State of Vegetation.

Botanists consider the *Leaves* of Plants, with regard to their Structure, to their Surface, Figure, Consistence, their Edges, Situation, and Size.

With regard to their Structure; *Leaves* are either single, as the *Apple-tree*, *Pear-tree*, &c. or double, as those of *Angelica*, *Parsley*, &c.

With regard to their Surface; *Leaves* are either flat, as the *Nummularia*, *Asarum*, *Ori-gany*, *Androsæmum*, &c. or hollow, as those of the *Onion* or *Asphodelus*; or in Bunches, as several Kinds of *Kali* and *Houfeleeks*.

With regard to their Consistence; *Leaves* are either thin and fine, as those of *St. John's-wort*, &c. or thick and gross, as those of *Portulaca*; or fleshy, as those of several Kinds of *Houfeleeks*; or woolly, as those of the *Gnaphalium*, &c.

With regard to their Edges; *Leaves* are either cut slightly, as some Species of *Geums*; or deep, as in some of the *Jacea's*.

With regard to their Situation; *Leaves* are either alternate, that is, ranged alternately, as the *Alaternus*; or opposite to each other, as the *Phillyrea*, and the *Mints*.

With regard to their Size; *Leaves* are either very big, as those of the *Collocasia* and *Spondylium*; or moderate, as those of *Bistort*, the *Fig-tree*; or small, as those of the *Apple-tree* and *Pear-tree*; or very small, as that of *St. John's-wort*.

Most Sorts of small Plants, and also several Sorts of Trees, which put forth a Root at the small End of the Seed, as soon as that Root has taken hold of the Ground, they put out two small *Leaves* above-ground, which are not at all like to those that grow on the Plant or Tree, which two false *Leaves* are the *Seed*, which divides it self into two Parts, and so remains some short Time on the Top of the Ground, and afterwards between those two false *Leaves* comes forth a Shoot, which produces *Leaves* like those of the Plant or Tree from which it came.

Of this Manner of Growth there is an infinite Number of Plants and Trees, as *Angelica*, *Carduus*, *Carrots*, *Melons*, *Parsnips*, *French-beans*, and indeed most Sorts of *Seeds*: And as to Trees, the *Apple*, the *Ash*, the *Elm*, the *Maple*, the *Pear*, the *Quince*, the *Sycamore*; and most Sorts of *Seeds* of Trees which are not environ'd by Stones or Shells.

Leaves is a Term us'd to express the most sensible and agreeable Parts of Flowers.

It is true, all Flowers have not *Leaves*; and it is difficult to determine which is to be call'd *Leaves*, and which the *Calix*, of the same Flower.

To prevent the confounding the *Leaves* of the Flowers with the rest of the Plant, those of the Flower are call'd *Petala*, from a Greek Word which the *Botanists* have adopted into their Latin Descriptions, when they speak of the *Leaves* of Flowers; the *Leaves* of Flowers, they call *Petala*; and those of Plants, *Folia*.

Dr. Grew observes, That the Fibres of *Leaves* are compos'd of the two general Kinds of Vessels, viz. for Sap and Air, and are ramify'd out of greater into less, as Veins and Arteries are in Animals.

And some are said to be of Opinion, that the Vessels in the *Leaves* of Plants are muscled, not Side to Side, but the Ends of some into the Sides of others. Yet this is not really done, the smaller Threads being so far deducted, as sometimes to stand at Right Angles with the larger; so that they are muscled only End to End, or Mouth to Mouth, after they are at last come to their final Dissolution.

Dr. Agricola gives Directions for Raising Trees from *Leaves*; to whose Treatise I shall refer those who have a mind to try the Experiment. I shall only say, that I my self have had the *Leaves* of *Cabbages*, *Laurustin's*, and some other Plants, strike out Roots when laid in the Earth, and have also rais'd several Sorts of *Aloes*, by planting their *Leaves*, which have shot out young Plants from their under-Parts.

Some

Some have made this Observation, that those Trees that hold their *Leaves*, have their Wood close and compact between their annual Circles; and the Reason that they hold their *Leaves* all the Winter is, that their Sap is of a clammy and turpentine Substance: And the Sap of such Trees as hold their *Leaves*, being once set by Cold, requires a great deal of Heat to make it thin and put it into Motion; as comparatively, a little Cold will set or stiffen Pitch or Turpentine, but it must be Frost that sets or stays the Motion of Water.

Those Trees which hold their *Leaves*, will grow much better under the Dropping of other great Trees than such as shed their *Leaves*, because their Turpentine-Sap shoot off the Drops: And as for those Trees that shed their *Leaves*, their Sap ascends in a small Quantity between the annual Circles in the porous Place: This, they say, may be observ'd in a Tree that is barked round, for that Tree will put forth *Leaves* and increase in Body, but produce little or no Shoot; and the more porous the Tree is between those animal Circles, the longer that Tree will live, as hath been experienc'd in *Walnut-trees*, *Ash-trees*, &c.

Naturalists ascribe to *Leaves* a four-fold Use:

1. Chiefly, that they do in the Spring-time receive the crude Humours into themselves, divide them very minutely, and move them strongly in the Utricles, and perhaps draw in from the Air what is necessary, though unknown to us, and carry back great Plenty of elaborated Juice to the Plant.

2. That there may be a Transpiration of what is unprofitable, answering to the Discharge made by Sweat; for sometimes those excretory Vessels of the *Leaves* are so overcharg'd by the great Plenty of distending Humour [Juice] that they burst in the Middle, and let go the more subtle Parts: Nor is it seldom, that in a hot Season great Plenty of Juices are this way discharg'd and imbib'd. Thus *Manna* is found to exude [sweat forth] as well from the *Leaves* as from the *Bark*, if a cold Night shall follow a hot Day: And the same thing frequently happens in divers other Plants and Trees; as we learn from the Bees flying to the *Lime-tree*, that they may gather that gummous Substance from their *Leaves*: But if the Heat shall be less, all the superfluous Humours (except those which perhaps are transmitted by insensible Transpiration through the arterial Vessels exhaling naturally) are seen to return into the Trunk.

3. That the bibulous Vessels dried by the diurnal Heat, and for this Reason to be compar'd to Veins, may imbibe, in the Night-time especially, those watery Parts which among others lie hid in the Air under the Form of a very thin Dew, and so make amends for the Loss made by the Arteries by the new Moistures receiv'd.

4. Lastly, the *Leaf* serves chiefly for this Purpose, that it may keep and nourish the Eye or Gem, until the Gem by degrees growing out to a greater Bulk, presses together the Vessels of the Foot-stalk, from whence the

Humour is by little and little stopp'd in the *Leaf*, till it cannot any more return to the Foot-stalk; which by the ceasing of the Afflux and Reflux of the nutritious Juice, grows putrid, whence a Consumption being caus'd, the *Leaf* dies and falls off, which is the chief Cause of the falling of the *Leaves* in *Autumn*.

The Reverend Mr. *Hales*, in his excellent Treatise of *Vegetable Statics*, speaking of the Perspiration of *Plants*, gives an Account of the following Experiments, viz.

That in *July* and *August* he cut off several Branches of *Apple-trees*, *Cherry-trees*, *Pear-trees*, and *Apricot-trees*, two of a sort; they were of several Sizes, from three to six Feet long, with proportional lateral Branches; and the transverse Cut of the largest Part of the Stems was about an Inch Diameter.

That he stripp'd off the *Leaves* of one Bough of each Sort, and then set their Stems in several Glasses, pouring in known Quantities of Water.

The Boughs with *Leaves* on them imbib'd some fifteen Ounces, some twenty, twenty-five or thirty in twelve Hours Day, more or less, in Proportion to the Quantity of *Leaves* they had; and when he weigh'd them at Night, they were lighter than in the Morning.

While those without *Leaves* imbib'd but one Ounce, and were heavier in the Evening than in the Morning, they having perspir'd little.

The Quantity imbib'd by those with *Leaves* decreas'd very much every Day, the Sap-Vessels being probably shrunk at the transverse Cut, and too much saturate with Water to let any more pass; so that usually in four or five Days the *Leaves* faded and wither'd much.

He adds, that he repeated the same Experiment with *Elm-branches*, *Oak*, *Osier*, *Willow*, *Sallow*, *Aspen*, *Curran*, *Gooseberry*, and *Philbert* Branches; but none of these imbib'd so much as the foregoing, and several Sorts of Ever-greens very much less.

He adds also another Experiment: That on the fifteenth of *August*, he cut off a large *Pippen* with two Inches Stem, and its twelve adjoining *Leaves*: that he set the Stem in a little Phial of Water, and it imbib'd and perspir'd in three Days one-third of an Ounce.

And that at the same time he cut off from the same Tree another bearing Twig of the same Length with twelve *Leaves*, no Apple on it, and it imbib'd in the same three Days near three-fourths of an Ounce.

That about the same Time, he set in a Phial of Water a short Stem of the same Tree, with two large Apples on it without *Leaves*, and they imbib'd near three-fourths of an Ounce in two Days.

So in this Experiment, the *Apples* and *Leaves* imbibe four-fifths of an Ounce; the *Leaves* alone near three-fifths; but the two large *Apples* imbib'd and perspir'd but one-third Part so much as the twelve *Leaves*: then the one *Apple* imbib'd the one-sixth Part of what was imbib'd by the twelve *Leaves*; there fore

fore two *Leaves* imbibe and perspire as much as one *Apple*: whence their Perspirations seem to be proportionable to their Surfaces; the Surface of the *Apple* being nearly equal to the Sum of the upper and under Surfaces of the two *Leaves*.

Whence it is probable, that the Use of these *Leaves* (which are plac'd just where the Fruit joins to the Tree) is to bring Nourishment to the Fruit.

And accordingly he observes, that the *Leaves* next adjoining to the Blossoms, are in the Spring very much expanded, when the other *Leaves* on barren Shoots are but beginning to shoot; and that all *Peach-Leaves* are very large before the Blossom goes off.

And that in *Apples* and *Pears*, the *Leaves* are one-third or half grown before the Blossom opens; so provident is Nature in making timely Provision for the nourishing the yet Embryo-Fruit.

He also adds another Experiment: He stripp'd the *Leaves* of an *Apple-tree* Branch, and then fix'd the great End of the Stem in the Gage; it rais'd the Mercury $2 + \frac{1}{2}$ Inches, but it soon subsided for want of the plentiful Perspiration of the *Leaves*, so that the Air came in almost as fast as the Branch imbib'd Water.

And as a farther Proof of the Influence of the *Leaves* in raising the Sap, he also made the following Experiment:

On the sixth of *August*, he cut off a large *Russet-Pippin* with a Stalk $1 + \frac{1}{2}$ Inch long, and twelve adjoining *Leaves* growing to it.

He cemented the Stalk fast in the upper End of a Tube; which Tube was six Inches long, and one-fourth Diameter: as the Stalk imbib'd the Water, it rais'd the Mercury four Inches high.

That he fix'd another *Apple* of the same Size in the same manner; but first pull'd off the *Leaves*, and it rais'd the Mercury but one Inch: That in the same manner he fix'd a like-bearing Twig with twelve *Leaves* on it, but no *Apple*, and it rais'd the Mercury three Inches.

He then took a like-bearing Twig without either *Leaves* or *Apple*, and it rais'd the Mercury one-fourth of an Inch.

So a Twig, with an *Apple* and *Leaves*, rais'd the Mercury four Inches; one with *Leaves* only three Inches; one with an *Apple* without *Leaves*, only one Inch.

A *Quince*, which had two *Leaves* just at the Twig's Insertion, rais'd the Mercury $2 + \frac{1}{2}$ Inches, and held it up a considerable time.

A Sprig of *Mint* fix'd in the same manner, rais'd the Mercury $3 + \frac{1}{2}$ Inches, equal to 4 Feet 5 Inches Height of Water.

These and many more Experiments of the Reverend Mr. *Hale*, that curious Inquirer into the Causes, State, and Progress of Vegetation, evidently shew the great Perspiration of the *Leaves* of Plants, and their great Use in raising the Sap and other Functions of Vegetable Nature: to whose excellent Treatise before-mention'd, I refer the curious Inquirer.

I shall add, that Nature has directed us as to the true Distance we ought to train the Branches of Trees against Walls or Espaliers, which should always be in Proportion to their *Leaves*; for if we observe the Progress of Nature in the great Variety of Trees, we shall always find their Branches grow distant from each other in Proportion to the Breadth of their *Leaves*: And it was upon this Account that the *Romans* so much admir'd the *Platanus*, because the *Leaves* being large, afforded them a kindly Shade in Summer; but in Winter, when they are destitute of *Leaves*, their Branches growing at a great Distance, easily admitted the Beams of the Sun.

Some there are who assert, that by the *Leaves* of each aspiring Plant, a Person may distinguish each kind of Fruit, whether delicate or harsh, that the Hopefulness of the Fruit may be distinguish'd by the first *Leaves* of the yearling Plant; and for this they lay down the following Rules:

1st, That a short and dark green *Leaf* prognosticates a crabbed Fruit.

2dly, That a Tree with a larger *Leaf*, thick, and of a dark Green, will bear a good Winter *Apple*; but the Stock hardy, to endure a stiff clayey Ground.

3dly, That a fady, willowish *Leaf* denotes a flat, insipid *Apple*, as the *Kentish Codlin*, which holds out against Blasts.

4thly, That a paler Green, as the *Popinsay* or *Barbary Leaf*, especially if the *Leaf* be limber, denotes a delicate Fruit; and the broader the *Leaf* is, the fairer the Fruit.

5thly, That a wrinkled *Leaf*, neither very dark, nor very bright, proves Red-streak'd: *Crab-stocks* have reddish Tops.

But there is no great Certainty in these Rules, nor can a Person, though ever so curious in his Observations, exactly determine the various sorts of Fruits by their *Leaves*, notwithstanding what many People have asserted.

The before-mention'd Reverend Author, in his Treatise of *Vegetation*, says, It is plain from many Experiments and Observations before-mention'd, that *Leaves* are very serviceable in this Work of *Vegetation*, by being instrumental in bringing Nourishment from the lower Parts, within the Reach of the Attraction of the growing Fruit, which, like young Animals, is furnish'd with proper Instruments to suck it thence; but the *Leaves* seem also design'd for many other noble and important Services: for Nature admirably adapts her Instruments, so as to be at the same time serviceable to many good Purposes.

Thus the *Leaves*, in which are the many Excretory Ducts in Vegetables, separate and carry off the redundant watery Fluid, which by being long detain'd, would turn rancid and prejudicial to the Plant, leaving the more nutritive Parts to coalesce; part of which Nourishment, we have good Reason to think, is convey'd into Vegetables thro' the *Leaves*, which do plentifully imbibe the Dew and Rain, which contain, Salt, Sulphur, &c.

For the Air is full of acid and sulphureous Particles; which, when they abound much, do,

do by the Action and Reaction between them and the Elastick Air, cause that sultry Heat which usually ends in Lightning and Thunder; and these new Combinations of Air, Sulphur, and acid Spirit, which are constantly forming in the Air, are, doubtless, very serviceable in promoting the Work of Vegetation; when being imbib'd by the *Leaves*, they may not improbably be the Materials out of which the more subtle and refin'd Principles of Vegetables are form'd: For so fine a Fluid as the Air seems to be a more proper Medium, wherein to prepare and combine the more exalted Principle of Vegetables, than the grosser watery Fluid of the Sap: And, for the same Reason, 'tis likely that the most refin'd and active Principles of Animals are also prepared in the Air, and thence convey'd thro' the Lungs into the Blood; and that there is Plenty of these sulphureo-aërial Particles in the *Leaves*, is evident from the sulphureous Exudations that are found at the Edges of *Leaves*, of which Bees are observed to make their waxen Cells, as well as of the Dust of Flowers. And that Wax abounds with Sulphur, is plain, from its burning freely, &c.

We may therefore reasonably conclude, that one great Use of *Leaves*, is what has been long suspected by many, viz. to perform, in some measure, the same Office for the Support of the Vegetable Life, as the Lungs of Animals do for the Support of Animal Life; Plants, very probably, drawing through their Leaves some Part of their Nourishment through the Air.

LEEKs; vide Porrum.

LEGUMES or LEGUMENS, are a Species of Plants which are call'd *Pulse*, such as *Peas*, *Beans*, &c. and are so call'd, because they may be gather'd by the Hand, without cutting. Mr. Ray reckons all those Plants which have a papilionaceous Flower, among the *Legumes*.

LEGUMINOUS, of, or belonging to *Pulse*.

LEGUMINOUS Plants, are such as bear *Pulse*, with a papilionaceous Flower: Their Flower is difform, and somewhat like a *Butterfly*, with Wings expanded (whence it is call'd Papilionaceous) consisting of four Parts, join'd together at the Bottom. Vide Papilionaceous.

LEMON-TREE; vide Limon.

LENS, [so call'd of *Lenis*, Lat. mild or gentle, because in old Times, those who ate these Seeds, were said to be of a gentle Temper.] Lentils.

The Characters are;

It hath a papilionaceous Flower; the Pointal of which becomes a short Pod, containing orbicular Seeds, which are, for the most part, convex; to which may be added, the Leaves are conjugated, growing to one Mid-rib, and are terminated by Tendrils.

The Species are;

1. LENS; vulgaris. C. B. P. Common Lentils.

2. LENS; major. C. B. P. Greater Lentils.

3. LENS; monanthos. H. L. Lentils, with a single Flower.

There are several Varieties of the first and second Sorts, which differ from each other in the Colour of their Flowers and Fruits; but these are accidental, and will often arise from the same Seeds, for which Reason they are not worth observing in this Place.

These Plants are very common in the warm Parts of Europe, and in the Archipelago, where they are the Food of the poorer sort of People, which they loath when they meet with better Fare; from whence came the Proverb, *Dives factus jam desit gaudere Lente*: which is apply'd to such as spurn at those Things in easy Circumstances, which they were glad of in a low Condition.

These Plants are one of the least of the *Pulse* kind, and call'd in some Places *Tills*: They may be propagated in the same manner as *Vetches*, &c. but must be sown a great deal thinner: They will grow upon a dry barren Soil best, and are a very good Fodder for Cattle; but as they require an annual Culture, so they are not at present very much esteem'd: Their Seeds are very good for Pigeons.

LENS PALUSTRIS; Duck-Meat. This is a very common Plant, growing upon standing Waters in most Parts of England.

LENTISCUS; [takes its Name of *Lentor*, Lat. i. e. *Pliable*.] The Mastick-Tree.

The Characters are;

The Leaves are pinnated; the Lobes growing opposite, and are fasten'd to one common Mid-rib; the Male Flowers, which are produced upon separate Trees from the Fruit, have short, green, quadrifid Cups, which expand in Form of Stars, having four or five short Stamina, with large red Apices: These Flowers are collected into a Bunch: The Ovary, in the Female Plants, which grows upon the Top of a long, thick Foot-stalk, is commonly branch'd, and becomes a Fruit which contains a Nut with a hard Shell.

The Species are;

1. LENTISCUS; vulgaris. C. B. P. Common Mastick-Tree.

2. LENTISCUS; vulgaris, foliis minoribus & pallidioribus. H. L. The Male Mastick-Tree, with lesser and paler Leaves.

These two Plants are promiscuously preserv'd in many curious Gardens in England, where they are commonly kept in Pots and Tubs, and hous'd in the Winter, with *Oranges*, *Myrtles*, &c. but in some Places, which are well defended from cold Winds, I have observ'd them growing in the open Air, without suffering the least Injury from our ordinary Winters; but in extreme hard Weather they are sometimes greatly damag'd; however, as they are seldom quite destroy'd, especially if the Plants are strong, and have taken good Root in the Ground, so it is worth our Care to endeavour to naturalize them to our Climate: which may easily be effected, provided you keep them in Pot until they have acquir'd a

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sufficient Strength, and then shake them out in the *Spring* of the Year, preserving as much of the Earth to their Roots as you can, planting them on a dry warm Soil, and in a well-shelter'd Situation, and in Winter lay some Mulch upon the Surface of the Ground about their Roots, to prevent the Frost from penetrating to them, as also in very severe Frosts you should cover their Stems and Heads with some Straw or Peas Haulm, which will prevent their being destroy'd, and after they have been inured to the open Air for two or three Years, they will then be mostly out of Danger, and will grow much better than those Plants, which are kept in Pots or Tubs.

These Plants are propagated by laying down their young Branches in the Spring, which should be slit at a Joint (as is practis'd in laying Carnations) and in dry Weather they must be frequently watered to encourage their striking Root, which they rarely do until the second Year, before which they should not be disturb'd; but then if they have taken sufficient Root, they should be transplanted in April, placing them, as was before directed, into a warm Situation, observing to water them in dry Weather, as also to lay some Mulch about their Roots to prevent the Ground from drying too fast; and in Winter lay a little fresh Mulch about them to keep out the Frost; after two or three Years, they will be sufficiently hardy, and will require no farther Care, but to dig the Ground about them every Spring, and keep them clean from Weeds, as also to trim up the lateral Branches, to make them aspire in Height; but by no Means should you shear them into Balls and Pyramids (as is the common Practice) but let them grow in their utmost Luxuriancy, in which Manner they will appear much more beautiful than in those studied Figures.

These Plants may also be propagated from the Berries, which may be obtained from the Southern Parts of *France* or *Spain*, where they grow in great Plenty; they must be sown in Pots or Tubs of light fresh Earth, and housed in Winter (for the Plants seldom come up until the second Year) but in Summer they should be exposed in a warm Situation, and often refresh'd with Water; when the Plants come up they must be carefully clear'd from Weeds, and refresh'd with Water in dry Weather, and in Winter the Pots or Tubs must be removed into Shelter, but should have a great Share of free Air in mild Weather; and the *Spring* following the Plants should be taken up, and each of them planted into a separate Pot, then plunge the Pots into a moderate Hot-bed to facilitate their taking Root, after which they may be expos'd to the open Air (as was directed for the older Plants) and continue to house them every Winter, until they are three or four Years old, after which they may be planted into the open Air, when they must be treated as the old Plants.

These Trees are always Green, which renders them more valuable, and their Leaves being of a beautiful Figure, and their Heads generally growing very regular, renders them

worthy of a good Situation; they seldom rise above twelve or fourteen Feet high with us, and should therefore be intermix'd with other Ever-greens of the same Growth.

LEONTOPETALON [*λεοντοπétalon* of *λέων*, a Lion, and *πέταλον*, a Leaf, q. d. Lion's-Leaf; because the Antients fancied the Leaves of this Plant resembled a Lion's Paw.] Lion-leaf.

The Characters are;

It hath a thick tuberose perennial Root; the Flower is naked, and consists of five or six Petals which expand in Form of a Rose, garnish'd with five Stamina; in the Middle of the Flower rises the Pointal, which afterwards becomes a Bladder, containing many spherical Seeds.

We have but one Species of this Plant in the English Gardens; which is,

LEONTOPETALON; *foliis castæ remosæ innascentibus. Flor.* Lion-leaf, with Leaves growing on a branched Rib.

This Plant is found in great Plenty in the Islands of the *Archipelago*, and also in some Parts of *Italy*, but at present is very rare in *England*; it may be propagated by sowing the Seeds, or parting of the Roots; but the former is the best Method, if the Seeds could be obtained from Abroad; for they seldom produce good Seeds in *England*, nor do they increase very fast by their Roots.

The Seed of this Plant should be sown soon after it is ripe, in Pots or Tubs fill'd with fresh light Earth, that the Plants may be removed into Shelter in the Winter, for if they are expos'd at that Season (which is the Time they do arise) the Cold will destroy them; but in the Summer they should be set abroad, where they may have the Morning Sun until Ten of the Clock, and when the Plants are strong enough to be transplanted, they should be each of them put into a separate Pot, and in Winter placed into a Hot-bed Frame, where they may be shelter'd in severe Frosts; but in mild Weather they should be expos'd to the open Air.

When the Plants are two Years old, they may be taken out of the Pots and planted into a warm Border under a South Wall, where they will endure the Cold of our ordinary Winters very well, being seldom hurt by severe Frosts, or too much Wet; for which Reason they should always be planted in a dry Soil.

The best Season for transplanting these Roots is in *May*, when their Leaves are decay'd; for if you defer it till *July* or *August*, they will be striking out new Roots, when they will not be so safely removed: They produce their Flowers in Winter, for which they are chiefly valued.

LEONTOPODIUM; *vide* Plantago.

LEONURUS [*λεονύριον* of *λέων*, a Lion, and *ουρα*, a Tail, because the Crest of this Flower seems to resemble the Tail of a Lion] Lion's-Tail.

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The Characters are ;

It is one of the verticillate Plants with a lip Flower, which consists of one Leaf, whose Galea or Crest is imbricated, and much longer than the under Lip, which is divided into three Segments ; out of the Flower-cup rises the Pointal fix'd like a Nail to the hinder Part of the Flower, surrounded by four Embryo's, which afterwards turn to so many Seeds, which are oblong, and enclosed in a long fistulous Husk, which before was the Flower-cup.

The Species are ;

1. LEONURUS ; *perennis, Africanus, sideritis folio, flore phœnicio majore.* Breyn. prod. Perennial African Lion's-tail, with an Iron-wort Leaf, and a large scarlet Flower.

2. LEONURUS ; *perennis, Africanus, sideritis folio, variegato, flore phœnicio majore.* Perennial African Lion's-tail, with a variegated Iron-wort Leaf, and a large scarlet Flower.

3. LEONURUS ; *minor, Capitis Bonæ Spei vulgō.* Boerb. Ind. Lesser Lion's-tail from the Cape of good Hope, with a Cat-mint Leaf.

These Plants are very great Ornaments in a Green-house, producing large Tufts of beautiful scarlet Flowers in the Months of *October* and *November*, when few other Plants are in Perfection, for which Reason a good Green-house should never be wanting of these Plants, especially since they require no artificial Heat, but only to be preserved from hard Frosts, so that they may be placed amongst *Oranges, Myrtles, Oleanders, &c.* in such a Manner, as not to be too much over-shaded with other Plants ; but that they may enjoy as much free Air as possible in mild Weather.

They are easily propagated by planting Cuttings of any of the Sorts, in Pots fill'd with light Earth, any time in *July* or *August*, observing to shade and water them until they have taken Root, after which they must be each of 'em planted into a separate Pot fill'd with light rich Earth, and often refresh'd with Water (for it is an Aquatick Plant in its native Country) and in *October* they must be removed into the Green-house ; but in *May*, they should be expos'd again to the open Air, placing them where they may have the Morning Sun till Eleven of the Clock, observing never to let them want Water, which will encourage them to produce strong Tufts of Flowers in *Autumn*.

These Plants will grow to be eight or nine Feet high, and abide many Years ; but are very subject to grow irregular, therefore their Branches should be pruned early in the *Spring*, in order to reduce them to a tolerable Figure ; but they will not bear to be often pruned or shear'd, nor can they ever be form'd into Balls or Pyramids, for if they are often shorten'd, it will prevent their flowering.

The strip'd Sort is by many People valued for the Variety of its Leaves ; but as that is occasion'd by a Weakness in the Plant, so the Flowers of that Sort are never so large and fair, as are those of the plain Sort, nor produced in so great a Quantity.

The third Sort is also preserved for Variety more than its Beauty ; the Flowers of this

being much smaller, and not so well colour'd, as are those of the common Sorts.

LETTUCE ; vide *Lactuca*.

LEUCANTHEMUM [*leucis & thymis of leucis, White, and thymis, a Flower.*] Ox-eye Daizy.

The Characters are ;

It agrees in every respect with the *Chrysanthemum*, except in the Colour of its Semi-florets, which in these are constantly *White*.

The Species are ;

1. LEUCANTHEMUM ; *vulgare.* Tourn. Common Ox-eye Daizy.

2. LEUCANTHEMUM ; *Alpinum, majus, rigidum folio.* Tourn. Greater Ox-eye Daizy of the Alps, with stiff Leaves.

3. LEUCANTHEMUM ; *radice repente, foliis latioribus serratis.* Tourn. Creeping-rooted Ox-eye Daizy, with broad serrated Leaves.

4. LEUCANTHEMUM ; *folio absinthii Alpinum.* Ciasfi. Alpine Ox-eye Daizy, with a Wormwood Leaf.

5. LEUCANTHEMUM ; *tanacetii folio, flore majore.* Boerb. Ind. Ox-eye Daizy, with a Tansy Leaf and a large Flower.

6. LEUCANTHEMUM ; *Canariense, foliis Chrysanthemi, sapore pyrethri.* Tourn. Canary Ox-eye Daizy, with a Chrysanthemum Leaf, and a Taste like *Pellitory of Spain*, vulgarly called *Pellitory of Spain*.

The first of these Plants is very common in the Meadows, in most Parts of *England*, from whence the Flowers are gathered and brought into the Markets in *London* for Medicinal Uses, but it is seldom cultivated in Gardens.

The second and fifth Sorts are many times planted in Gardens for their Beauty ; these produce large Tufts of white radiated Flowers upon the Summits of their Stalks, which continue a long time in Beauty ; they commonly grow two Feet high or more, for which Reason they should always be placed in the Middle of large Borders, and require to be planted at a good Distance from other Plants, otherwise they will over-bear them ; so that they are not very proper for small Gardens, taking up too much Room.

These are very hardy Plants, and may be propagated either by sowing their Seeds, or parting their Roots ; the best Time for sowing of their Seeds, is in *March*, upon a Border of light fresh Earth, and when the Plants are come up pretty strong, they must be transplanted into fresh Borders of the like Earth, placing them at eight Inches Distance each Way ; in these Borders they may remain till *Michaelmas*, when they should be removed into the Borders where they are to continue, and the Summer following they will produce Flowers and Seeds.

But if you would propagate them by parting their Roots, the best Season for this Work is in *September* or *October* ; for if it be done in the *Spring*, they seldom flower so strong the succeeding *Summer*.

The third Sort multiplies too fast by its creeping Roots, which will spread and come up at a great Distance from the old Plant, so

that it is hardly to be kept within tolerable Bounds ; but is very apt to run over whatever Plants stand near, for which Reason it should never be placed amongst choice Flowers, but allowed a Place in some abject Part of the Garden, in a Corner allotted to it, where it will grow to the Height of four Feet, and produce large radiated white Flowers in *August* and *September*.

The fourth Sort is seldom admitted into curious Flower-Gardens, it being a rambling Plant, and the Branches trailing upon the Ground, renders it unsightly, nor are the Flowers very beautiful ; so that it is seldom preserved but in Botanick Gardens.

These are all very hardy Plants, and will grow in almost any Soil or Situation, and there being very little Trouble in their Culture, they deserve Room in all large Gardens.

The sixth Sort is tenderer than any of the former, and must be preserved in Pots and sheltered in the Winter. This is propagated by planting Cuttings in any of the Summer Months, into a Border of light Earth, observing to water and shade them from the great Heat of the Sun until they have taken Root, after which they must be planted into Pots fill'd with light fresh Earth, and expos'd to the open Air until the Middle or latter End of *October*, when they must be housed ; but should be placed into the coolest Part of the House, where they may have much free Air in mild Weather, and must be frequently refresh'd with Water ; but in *Summer* time they may be expos'd to the open Air, in a shady Situation, where they will thrive much better than if expos'd to the Sun, which would dry the Earth too fast, so that they would constantly require to be watered.

This Plant is not apt to continue above two or three Years without renewing, therefore Cuttings should be planted every other Year, to maintain the Kind, where People are curious to preserve their Varieties : There is no great Beauty in this Plant, but it is preserved in some Gardens, for the true *Pellitory of Spain*, which in reality is a different Plant, though this has a very sharp acrid Taste, much like that of the *Pellitory*.

LEUCOJUM [*λευκόιον* of *λευκόν*, *White*, and *ἵον*, a *Violet*, i. e. *White Violet*.] Stock-July-flower.

The Characters are ;

The Flower is composed for the most part of four Leaves, which are placed in Form of a Cross ; out of the Flower-cup rises the Pointal, which becomes a long flat Pod, divided into two Cells by an intermediate Partition, to which the Valves adhere on both Sides, and are furnish'd with flat smooth Seeds, which are orbicular and border'd round their Edges ; to which may be added, the Flowers are specious and sweet-smelling.

The Species are ;

1. **LEUCOJUM ; incanum, majus.** C. B. P. Great hoary Stock-July-flower, with single white Flowers.

2. **LEUCOJUM ; incanum, majus, flore cinericeo.** C. B. P. The great hoary Stock-July-flower, with an Ash-colour'd Flower.

3. **LEUCOJUM ; purpureum, vel rubrum.** C. B. P. Purple or Red Stock-July-flower.

4. **LEUCOJUM ; incanum, majus, coccineum.** Mor. Hist. The greater hoary crimson Stock-July-flower, vulgarly call'd the *Brumpton* Stock.

5. **LEUCOJUM ; violaceum.** Tabern. Violet-coloured Stock-July-flower.

6. **LEUCOJUM ; incanum, majus, multiplex, flore purpureo.** C. B. P. Greater hoary Stock-July-flower, with a double Purple Flower.

7. **LEUCOJUM ; incanum, majus, multiplex, flore rubro.** C. B. P. Greater hoary Stock-July-flower, with a double red Flower.

8. **LEUCOJUM ; incanum, majus, multiplex, flore albo.** Tourn. Greater hoary Stock-July-flower, with a double white Flower.

9. **LEUCOJUM ; incanum majus, variegatum, pleno flore.** C. B. P. The greater hoary Stock-July-flower, with a double variegated Flower.

10. **LEUCOJUM ; majus, incanum, variegatum album, flore simplici, maculis in albo rubris.** C. B. P. The greater hoary Stock-July-flower, with a single white Flower spotted and strip'd with Red.

11. **LEUCOJUM ; pleno flore, album, sanguineis maculis signatum.** Hort. Eyst. White Stock-July-flower, with a double Flower, mark'd with bloody Spots.

12. **LEUCOJUM ; pleno flore, album, purpureis maculis signatum.** Hort. Eyst. White Stock-July-flower, with a double Flower mark'd with purple Spots.

13. **LEUCOJUM ; incanum majus, variegatum, pleno flore, foliis in ambitu argenteis.** H. L. The greater hoary, variegated Stock-July-flower, with a double Flower, and Leaves edg'd with Silver.

14. **LEUCOJUM ; minus & annuum.** Dod. Lesser annual Stock-July-flower.

15. **LEUCOJUM ; album, odoratissimum, folio viridi.** C. B. P. The most sweet-smelling Stock-July-flower, with a green Leaf, commonly call'd the *White Wall-flower*.

16. **LEUCOJUM ; album odoratissimum, folio viridi, pleno flore.** The double white Wall-flower ; *vulgô*.

17. **LEUCOJUM ; luteum, vulgare.** C. B. P. The common yellow Wall-flower.

18. **LEUCOJUM ; luteum, flore pleno, minus.** C. B. P. The common double Wall-flower.

19. **LEUCOJUM ; angustifolium, Alpinum, flore sulphureo.** H. R. Par. Narrow-leav'd Alpine Wall-flower, with a Brimstone-colour'd Flower.

20. **LEUCOJUM ; angustifolium, Alpinum, flore pleno sulphureo.** Narrow-leav'd Alpine Wall-flower, with a double Brimstone-colour'd Flower, commonly call'd the *Straw-colour'd Wall-flower*.

21. **LEUCOJUM ; luteum magno flore.** C. B. P. Wall-flower, with a large Flower.

22. **LEUCOJUM ; luteum, flore pleno, majus.** C. B. P. The greater Wall-flower, with a double Flower.

23. **LEUCOJUM ; majus, flore intus luteo extus ferrugineo.** Greater Wall-Flower, with larger Flowers, Yellow within, and on the Out-side of an Iron-colour, commonly call'd the *Ravenal Wall-flower*.

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24. *LEUCOJUM*; *majus, flore majore pleno, intus luteo extus ferruginea*. The double Ravenal; *vulgô*.

25. *LEUCOJUM*; *majus, flore pleno ferrugineo*. *Tourn.* The old double bloody Wall-flower.

26. *LEUCOJUM*; *luteum, pleno flore, foliis ex luteo variegatis*. The yellow variegated Wall-flower, with a double Flower.

27. *LEUCOJUM*; *luteum pleno flore, foliis ex albo eleganter variegatis*. The Silver-strip'd Wall-flower, with a double Flower.

There are several other Varieties of these Flowers, which are preserv'd in some curious Botanick Gardens; but those here-mentioned, are the most beautiful, and best worth propagating, in all curious Flower-Gardens.

All the Sorts of *Stock-July-flowers* are propagated by Seeds: The best Time for Sowing 'em is in the Beginning of *April*, upon a Border of fresh light Earth, where they may be expos'd to the Morning Sun; for if they are too much expos'd to the Sun in the Heat of the Day, they are very subject to be eaten by a sort of Fly, as they often are while young, upon a hot dry Soil: To remedy which, you should always sow a few *Radishes* amongst them, which will secure 'em from this Mischief; for the Flies will always prey upon the *Radishes*, whereby your *July-flower* Plants will be preserved; but then you must not suffer the *Radishes* to be too thick amongst them, for that would draw 'em up very weak, and cause 'em to be long-shank'd. When your Plants have gotten six Leaves, they must be transplanted into other Borders of the like fresh Earth, and expos'd to the Morning Sun at about four Inches Distance, observing to water and shade 'em until they have taken Root; after which, they will require no farther Care, than only to keep them clear from Weeds until the Latter-end of *August*, or the Beginning of *September*, when you must transplant them into the Borders of the *Pleasure-Garden*; which should be done, if possible, in moist Weather, that they may the sooner strike Root, whereby they will be securely fasten'd in the Ground before the Frost comes on, which would prevent their taking Root, and thereby either quite destroy them, or at least cause 'em to flower very weak the succeeding *Spring*.

There are many People who make a great Stir about sowing these Seeds, and transplanting the Plants always at the same time when the Moon is at the Full, in order to obtain a greater Number of double Flowers; but from several Years Observation, I could never observe any thing in this Management, nor from the frequently removing the Plants, as is by some directed, which only weakens them, and causes 'em to produce smaller Bunches of Flowers; but I could not find any more of them come double by this Management, than if they had never been remov'd: But the best Method that I have observ'd, to have these Flowers in the greatest Perfection, is to change the Seeds every Year, if you can procure a good Correspondent at some Place at a great Distance from you, who will faithfully furnish you with

good Seeds: And in sowing these Seeds, if you observe a greater Number of Petals than usual in the single Flowers, it is a good Sign that the Seeds of such Plants will produce double Flowers.

As these Plants are commonly biennial, and seldom continue longer than the second Year, so there will be a Necessity of sowing Seeds every Year; for when they have flower'd and seeded, they commonly decay soon after, as also do the Double Flowers soon after they are out of flower; or if some of them should continue another Year, they are seldom so strong, or produce so fair Flowers as the young seedling Plants: so that, upon the Whole, they are scarcely worth standing. And tho' some People recommend the Propagating the Double Sorts from Slips and Cuttings, as the surest Way to have Double Flowers, which indeed is very true; yet the Plants thus rais'd are always weaker than those rais'd from Seeds, and never produce their Flowers near so large or fair: Wherefore, (as I said before) it is better to have a Succession of Seedling Plants every Year, amongst which you will always have a Quantity of Double Flowers, provided your Seed be good.

The *Brompton Stock-July-flower* is by many People most valu'd, for the Largeness of its Flowers, and the Brightness of their Colour: but this Sort seldom produces more than one Spike of Flowers upon a Plant; whereas the *Italian* and *Purple* Sorts produce several very fair Bunches upon each Plant, especially if they have Strength: And there is a Sort commonly call'd The *Stock-major*, (which, probably, is the seventh Sort here mention'd) which branches out on every Side, and produces many fair Spikes of Flowers from one Root; these are of a beautiful Red Colour: As doth another Sort, commonly (tho' falsely) call'd The *Annual Stock*, which will produce its Flowers the first Year from Seed; but then the Plants commonly continue the next Season, and flower again very strong, and these often produce some Variety in the Colour of their Flowers, some being of a beautiful Scarlet, and others of a pale Red Colour, and some of them are finely variegated; and these all produc'd from Seeds taken from the same Plant: but this Sort is very apt to degenerate, if the Seeds are not frequently changed.

The small *Annual Stock-July-flower* will produce Flowers in about ten Weeks after sowing, (which has occasion'd its being call'd The *Ten Weeks Stock*); and if the Season be tolerably cool and moist, these Flowers will be very large: And many times there are large Double Flowers produc'd among them, which renders them well worth propagating, especially if you sow them in *May*, which will cause them to flower in *August* and *September*, when Flowers are beginning to be scarce in the Gardens. These Plants produce ripe Seeds the same Year, and rarely survive thro' a Winter.

These Plants should all be planted in a fresh light Soil, which must not be dung'd; for they don't do so well upon a rich Soil, in

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which they are apt to grow very rank, and then their Roots canker and decay; so that they seldom abide the Winter in such Soils; but in a fresh Soil they will stand our ordinary Winters extremely well, and will produce large fair Flowers.

The Common Single *Wall-flower* is very seldom cultivated in Gardens, but is often found growing upon old Walls and Buildings in divers Parts of *England*: This is the Sort which is directed in the College *Dispensatory* for medicinal Uses. But the Double of this Kind is very common in most of the *English* Gardens, which is propagated by planting Slips or Cuttings in any of the *Spring* Months, observing to water and shade them until they have taken Root; after which, they may be remov'd to the Places where they are to remain.

The Straw-colour'd *Wall-flower* with Double Flowers was formerly more common in the *English* Gardens than at present: This is a much finer Sort for Shew than the Common, the Plants generally growing more upright; and the Spikes of Flowers are much larger, and grow much closer together than those: but the Flowers have very little Scent; which, I suppose, has occasion'd its being less cultivated than it was formerly; tho' indeed, for Shew, it is inferior to none of the Sorts of *Wall-flowers*: This is also propagated by Slips, as the Common Sort.

The White *Wall-flower* is propagated by sowing the Seeds in *April*, in the manner before directed for the *Stock-July-flowers*; and if the Seeds are good, there will be many Double Flowers produc'd amongst them, which may be continu'd, by planting the Slips in the same manner as has been directed for the Common *Wall-flower*. But the Double of this Kind being somewhat tenderer than the other Sorts of *Wall-flowers*, should be planted into Pots fill'd with light fresh Earth, and in the Winter-season should be plac'd under a Hot-bed Frame, where they may be shelter'd from severe Frosts; but in mild Weather they should have as much free open Air as possible; in which Management they will endure two or three Years, and produce fair Flowers.

The large Flowering *Wall-flower* is also propagated by Seeds in the same manner as the *Stock-July-flowers*; for tho' it will grow from Slips, yet these seldom make so good Plants as those produc'd from Seeds, nor will they flower so strong. This Sort rarely produces many Double Flowers, but yet is well worth propagating, for the Largeness and Sweetness of its Flowers; and if they are planted in a very poor dry Soil, will continue two or three Years, and endure the Cold extremely well.

The *Ravensal Wall-flower* is at present in the greatest Esteem with the curious Florists, the Flowers of this Kind being full as large as the last-mention'd Sort, and are of a fine Reddish or Iron Colour on the Outside, as also of an extraordinary Sweetness; and this is more apt to produce Double Flowers than the former: It is propagated by Seeds, which should be sown

in *March*, and manag'd as was directed for the *Stock-July-flower*, observing never to plant them in a rich Soil, which will cause them to grow very fast during the Summer-season; but they seldom endure the Winter in such Soils. The Double-flower'd Plants of this Kind may also be propagated by Slips, in the same manner as the before-mention'd Sorts; but these should be shelter'd in Winter, as was directed for the White *Wall-flower*, otherwise they are subject to be kill'd by very sharp Frosts. The Seeds of this Kind should be often chang'd, or else they will greatly degenerate.

The old Double Bloody *Wall-flower* was formerly more common in *England* than at present, it being at this Time rarely to be seen: This is a Variety of the Common Double *Wall-flower*, from which it only differs in having the Outside of the Petals of a Bloody Colour: It may be propagated by Slips, as the Common Sort; but requires to be shelter'd from extreme Cold in the Winter, which often destroys these Plants if they are too much expos'd to it.

The Yellow-strip'd *Wall-flower* is also a Variety of the Common Double Sort, having its Leaves beautifully variegated in the Spring and Winter-season; but in the Summer, when the Plants are very free of Growth, they degenerate to be almost quite plain, so that at that Season there is very little Beauty in them: This is also propagated by Slips, as the Common Sort; but should be planted in a warm Situation, otherwise it will often suffer by great Colds in Winter.

The Silver-strip'd *Wall-flower* is much more beautiful than the last, and generally retains its beautiful Variegation through the whole Year: This is propagated by Slips, as the former; but should be shelter'd in Winter, being much tenderer than the last; for which Reason, the Plants should be set into Pots, and treated as the Double White *Wall-flower*: but you should observe, never to plant them in a rich Soil, which will cause them to become plain, (as I have often observ'd): nor should they have too much Moisture, which very often destroys 'em.

All the Sorts of *Wall-flowers* will abide the Cold much better if planted in a very gravelly and stony Soil, than when they are in a rich Earth, as may be observ'd by those which grow upon the Tops of Walls, and other Buildings, where sometimes they are very much expos'd to the cold Winds, and yet often endure the sharpest Winters; when those which were planted in a good Soil have been destroy'd, notwithstanding they have a warm Situation.

LEVEL, a Mathematical Instrument serving to draw a Line parallel to the Horizon, not only for various Uses in *Masonry*, &c. but also to measure the Difference of Ascent and Descent between several Places, for the Conveying of Water, Draining of Fens, &c.

A *Water Level* shews the horizontal Line, by means of a Surface of Water, or other Liquid,

Liquid, founded on this Principle, that Water always naturally places it self level.

The most simple Instrument for this Use, is made of a long wooden Trough or Canal whose Sides are parallel to its Base; so that being equally fill'd with Water, the Surface thereof shews the Line of Level.

This Level is also made with two Cups fill'd to the two Ends of a Pipe three or four Feet long, about an Inch in diameter; by means whereof, the Water communicates from the one to the other Cup; and this Pipe being moveable on its Stand, by means of a Ball and Socket, when the two Cups become equally full of Water, the two Surfaces mark the Line of Level.

Instead of Cups, this Instrument may be made with two short Cylinders of Glass three or four Inches long, fasten'd to each End of the Pipe with Wax or Mastick; then the Pipe being fill'd either with common or colour'd Water, will shew it self through the Cylinder, by means of which the Line of Level is determin'd; the Height of the Water, with respect to the Centre of the Earth, being always the same in both Cylinders. This Level is very commodious in Levelling small Distances.

If you would level any Piece of Ground that you can see from Side to Side, or from the Middle to any Side, set up your Instrument in the Middle of it, whether it be a Water Level or a Ground Level with Sights: Place it so high, that you may see over the highest Part of the Ground half a Foot, or a Foot; then set up a Stake in the Middle, so that the Top may be exactly level with the Sights, and another Stake on the highest Side, the Top of which must be level with the middle Stake: Then either turn the Level or Look-back Sight, and set up another Stake on the Lower Ground level with the two first; so then you will have three Stakes standing in a Level.

Then keeping your Level true to the middle Stake, turn it 'till it makes Right Angles with the three Stakes, and set up two Stakes on each Side one Level with those three: so that then you will have five Stakes in two Lines set true Level.

If the Ground be large, you may set up two Rows more by the Level; but five Stakes are enough in a small Ground.

When this is done, you may lay your Level aside; and look over the Head of one to the Head of another, and cause the Person who assists you to put down Stakes between two and two, 'till you have set as many Stakes Level in the Ground as you think convenient; or you may use a Rule, which being plac'd level with the Head of the Stake, you may look over that to the Head of the other, and put Stakes down between you and the other Stake to what Number you please.

The Ground being thus staked out, with all the Stakes Heads level, and half a Foot higher than the highest Ground; in some Grounds the middle Stake and the Stakes in the Cross-Line will be the Level-Line the

Ground must be brought to; that is, abating the Hill, and filling up the Low Side to the Level of the Mid-Line. But if the Ground be very uneven, then you must measure over all the Stakes, and take them middle high for their Mean-Level, and, by the Rule of Three, proportion your Ground to that.

As for Instance: If a Valley be ten Poles in length, and two Feet in depth from the strait Line, and there be a Hill five Poles long; How many Feet deep must a Person sink those five Poles to fill up the Valley? This Question may be resolv'd by the Inverse or Back Rule of Three, and will stand thus; As 5 is to 2, so is 10 to 4.

$$5 \text{ --- } 2 \text{ --- } 10$$

2

$$5) 20(4$$

So that a Person must go four Feet deep in such a Hill to make good such a Valley.

If you are to abate the Top of a Hill four Feet deep, and two Poles from the Top of that Hill, those four Feet are to come out.

To perform this, set up a Stake on the Top of a Hill two or three Feet above-ground, and another of the same Height where the Depth comes out; set down a Stake three Rods from that, till the Head comes to be in a Line with these two, and at that Stake you must be one Foot deep.

At six Poles, stake down another, as before, and there you must be two Feet deep; Then stake down another at nine Poles, and there you must be three Feet deep; and you may set more Stakes at equal Distances, which will direct you so as that you cannot go amiss.

LEVITY, is the Privation or Want of Weight in any Body, when compar'd with another that is heavier, in which Sense it is oppos'd to Gravity.

The School-men maintain, that there is such a thing as Positive and Absolute Levity, and impute this to Rise and Emergency of Bodies lighter in Specie than the Fluids wherein they rise.

But besides that the common Sense of Mankind discovers, that Levity is only a relative Term; we find that all Bodies tend towards the Earth, some slower, and some faster, in all Fluids or Mediums, whether Water, Air, &c.

Thus Cork is said to be lighter than Gold, because under equal Dimensions of Bulk the Gold will sink in, and the Cork swim upon the Water.

Archimedes has demonstrated, that a solid Body will float any where in a Fluid of the same specifick Gravity, and that a lighter Body will keep above a heavier.

The Reason of this is, because Bodies falling towards the Earth, those which have a like Number of equal Parts, have equal Gravity; since the Gravity of the Whole is the Sum of the Gravity of all its Parts.

Now two Bodies have an equal Number of equal Parts, if under the same Dimensions there

there are no Intervals destitute of Matter: Whence it follows, that as no Portion of Matter is so small, but that Body wherein it is contain'd, may be wholly divided into Parts equally small, there can be no Reason for the Descent of these, which will not equally hold for the Descent of that.

Hence it may be concluded, that those Bodies which do not equally gravitate under the same Dimensions, do not contain the same equal Portions of Matter; and therefore when we see that a Cube of Gold subsides in Water at the same time that an equal Bulk of Cork swims upon it, it is evident that the Gold must have a greater Number of equal Parts of Matter under the same Bulk than the Cork; or the Cork must have a greater Number of Vacuities than the Gold; and that there are also in the Water a greater Number of Vacuities than in the Gold.

Hence we have a clear Idea both of *Density* or *Gravity*, and of *Levity*; and know, that in a strict Sense, the latter cannot be accounted any thing positive, but a mere Negation or Absence of Body, which determines that Body to be lighter than another which contains mere Matter.

LIGHT is us'd in various Senses: 1. Sometimes it signifies that Sensation which is occasion'd in the Mind by the View of luminous Bodies.

2. For those Properties in those Bodies, whereby they are fitted to excite those Sensations in us.

3. A certain Action of the luminous Body on the Medium, between that and the Eye, by the Means of which the one is suppos'd to act on the other; and this is call'd *secondary Light*, or *deriv'd Light*, in Distinction to that of luminous Bodies, which is call'd *primary* or *innate Light*.

As to the *Phænomenon of Light*, Philosophers have explain'd it several Ways: *Aristotle*, by supposing some Bodies to be transparent, as Air, Water, Ice, &c. The *Cartesians* have considerably refin'd upon this Motion of *Light*, and own that *Light*, as it exists in the luminous Body, is nothing else but a Power or Faculty of exciting in us a very clear and vivid Sensation: And Father *Malbranch* explains the Nature of *Light* by a suppos'd Analogy between it and *Sound*; the latter of which is allow'd to be produc'd by the Shaking or Vibration of the insensible Parts of the sonorous Body.

But the greatest Discoveries into this wonderful *Phænomenon* have been made by Sir *Isaac Newton*; That the Primary *Light* consists wholly in a certain Motion of the Particles of the lucid Body, whereby they do not propel any fictitious Matter suppos'd to be lodg'd in the hidden Pores of transparent Bodies, but throw off from the luminous Body certain very small Particles, which are emitted every Way with great Force.

And the *secondary* or *deriv'd Light*, not in a *Conatus*, but in a real Motion of these Particles receding every Way from the luminous

Body in right Lines, and with an incredible Velocity.

For it has been demonstrated by Mr. *Romer*, from the Observation on the Satellites of *Jupiter*, that the Progress of *Light* from the Sun to our Earth is not above ten Minutes, and therefore, since the Earth is at least 10,000 of its own Diameters distant from the Sun, *Light* must run 10,000 of those Diameters in a Minute, which is above 100,000 Miles in a Second.

And if a Bullet moving with the same Celerity, with which it leaves the Muzzle of a Cannon, requires twenty-five Years to pass from the Earth to the Sun, as Mr. *Huygens* has computed, then the Velocity of *Light* will be to that of a Cannon-Ball, as 25 Years is to 10 Minutes, which is above 10,000 to 1; so that the Particles of *Light* do move above a Million of times swifter than a Cannon Bullet; from which Rapidity of Motion very strange Effects may be produc'd: But Sir *Isaac Newton* has shewn, past Contradiction, that the *Light* of the Sun is near seven Minutes in its Passage to the Earth, which is the Space of 50,000,000; a Velocity 10,100,000 times greater than that wherewith a Ball flies out of the Mouth of a Cannon.

Sir *Isaac Newton* also observes, That Bodies and *Light* act mutually on one another: Bodies on *Light* in emitting, reflexing, refracting, and inflecting it; and *Light* on Bodies by heating them, and putting their Parts into a vibrating Motion, wherein Heat principally consists: For he observes, that all fix'd Bodies, when heated beyond a certain Degree, do emit *Light*, and shine; which Shining, &c. appears to be owing to the vibrating Motion of the Parts; and all Bodies abounding in earthy and sulphureous Particles, if they be sufficiently agitated, emit *Light*, which Way soever the Agitation be effected.

The same great Author observes, That there are but three Affections of *Light* wherein the Rays differ, viz. *Refrangibility*, *Reflexibility*, and *Colour*; and those Rays which agree in *Refrangibility*, agree also in the other two, whence they may be well defin'd homogeneous: Again, the Colours exhibited by homogeneous *Light*, he calls homogeneous Colours; and those produc'd by heterogeneous *Light*, heterogeneous Colours. From which Definitions he advances several Propositions:

1. That the Sun's *Light* consists of Rays differing by indefinite Degrees of *Refrangibility*.

2. That Rays, which differ in *Refrangibility*, when parted from one another, do proportionably differ in the Colours which they exhibit.

3. That there are as many simple and homogeneous Colours, as there are Degrees of *Refrangibility*; for to every Degree of *Refrangibility* belongs a different Colour.

4. *Whiteness*, in all respects, like that of the Sun's immediate *Light*, and of all the usual Objects of our Senses, cannot be compounded of simple Colours, without an indefinite Variety of them; for to such a Composition there are requir'd Rays endu'd with all the indefinite Degrees

Degrees of *Refrangibility*, which infer as many simple Colours.

5. The Rays of *Light* do not act one on another in passing through the same Medium.

6. The Rays of *Light* do not suffer any Alteration of their Qualities from Refraction, nor from the adjacent quiescent Medium.

7. There can be no homogeneal Colours produc'd out of *Light* by Refraction, which are not commix'd in it before; since Refraction changes not the Qualities of the Rays, but only separates those that have divers Qualities by means of their different Refrangibility.

8. The Sun's *Light* is an Aggregate of homogeneal Colours; whence homogeneal Colours may be call'd Primitive or Original.

Hence proceeds the whole Theory of Colours in Plants and Flowers.

Those Parts, v. g. which are the most refrangible, constitute Violet Colour, the dimmest and most languid of all Colours.

And, on the contrary, those Particles that are the least refrangible, constitute a Ray of a red Colour, which is the brightest and most vivid of all Colours: The other Particles being distinguish'd into little Rays, according to their respective Magnitudes and Degrees of Refrangibility, excite intermediate Vibrations, and so occasion the Sensations of the intermediate Colours. See Sir Isaac Newton's *Doctrine of Colours*.

Perhaps these Observations on *Light* may to some Persons seem foreign to the subject Matter of this Book, yet, if thoroughly understood, might probably be found very useful. That learned and curious Inquirer into the Business of *Vegetation*, the Reverend Mr. Stephen Hales in his Treatise on that Head, does upon the Query put by Sir Isaac Newton: ["Are not gross Bodies and *Light* convertible into one another? And may not Bodies receive much of their Activity from the Particles of *Light* which enter their Composition? The Change of Bodies into *Light*, and of *Light* into Bodies, is very conformable to the Course of Nature, which seems delighted with Transformations"] Add this Query; "And may not *Light* also, by freely entering the expanded Surfaces of Leaves and Flowers, contribute much to the ennobling the Principles of Vegetables?"

LIGUSTICUM; [takes its Name of *Liguria*, because this Plant, in old time, grew in greatest Plenty near a River of *Genoa*, call'd *Liguria*.] Lovage.

The Characters are;

The Lobes of the Leaves are cut about their Borders, like those of Parsley; the Flowers consist, for the most part, of five Leaves, which expand in Form of a Rose; each of these Flowers are succeeded by two oblong, gibbous, furrow'd Seeds, which on one Side have a leafy Border.

The Species are;

1. **LIGUSTICUM**; *vulgare, foliis Apii*. J. B. Common Lovage.

2. **LIGUSTICUM**; *Scoticum, Apii folio*. Tourn. Scotch Lovage, with a Parsley Leaf.

3. **LIGUSTICUM**; *Græcum, Apii folio*. T. Cor. Greek Lovage, with a Parsley Leaf.

The first of these Plants is often us'd in Medicine, and was formerly reckon'd amongst the Kitchen Herbs, but is now almost intirely cast out of the Kitchen-garden, and only cultivated for Physical Uses: This Plant may be easily propagated by sowing the Seeds, soon after they are ripe, in a moist Spot of Ground; and when the Plants come up the Spring following, they should be transplanted out to the Distance of eighteen Inches or two Feet asunder, in a moist Soil; where, if they are kept clear from Weeds, they will thrive exceedingly, and the second Summer will produce Seeds: But the Herb may be frequently cut for Use, their Roots abiding several Years, do shoot again continually after being cut; so that a few Plants will be sufficient for the Use of a Family.

The second and third Sorts are only preserv'd in Collections of Plants for Variety, but are not in any Use at present. These may be propagated in the same Manner as the former.

LIGUSTRUM; the Privet.

The Characters are;

The Leaves grow by Pairs opposite to each other; the Flower consists of one Leaf, is tubulous, and divided at the Top into five Segments; the Ovary in the Center of the Flower-cup becomes a globular soft Fruit, full of Juice, in which are lodg'd four Seeds.

The Species are;

1. **LIGUSTRUM**; *vulgare. Park. Theat.* The common Privet.

2. **LIGUSTRUM**; *foliis majoribus & magis acuminatis toto anno folia retinens*. Pluk. Alm. The Ever-green Privet.

3. **LIGUSTRUM**; *foliis è luteo variegatis*. H. R. Par. The yellow blotch'd Privet.

4. **LIGUSTRUM**; *foliis argentatis*. Breyn. Prod. The Silver-strip'd Privet.

The first of these Plants is very common in most Parts of England, and is seldom cultivated in Gardens, unless for Variety: It commonly grows about eight or ten Feet high, in Form of a Shrub, but may, by Art, be train'd up to a much greater Height, and may be intermix'd amongst other Trees of low Growth in Wildernesses.

The second Sort will grow much larger than the first, and is equally hardy: The Leaves of this commonly remain upon the Tree until the Spring before they decay, unless in very hard Winters; for which Reason, it is more esteem'd than the common Sort.

These Plants are easily propagated by laying down their tender Shoots in Autumn, which in one Year's time will be rooted enough to transplant; when they may be remov'd to the Places where they are design'd to remain, or planted in a Nursery for two or three Years; where they may be train'd for the Purposes design'd.

Formerly these Plants were greatly in Use for Hedges, but since so many others of greater Beauty have been introduc'd, which are much preferable to these for such Purposes, they

have been intirely rejected, the Trouble in keeping them in Order being very great, nor are the Hedges made with them ever so thick and handsome, as those made with divers other Plants.

The two variegated Kinds are pretty Varieties amongst other strip'd Shrubs: These may be propagated by budding, or inarching them upon the plain Sort, as also by laying down their Branches; but as they seldom shoot so fast, as to produce many Branches proper for Layers, so the other Method is chiefly us'd. The Silver-strip'd Sort is somewhat tenderer than the Plain, but will endure the open Air, if planted in a dry Soil, and in a warm Situation; but if either of the variegated Kinds be planted in a moist, rich Soil, they are subject to become plain from their vigorous Growth.

LILAC; [it is an *Arabick* Name, though some derive it from the *Lily*, because its Flowers bear some Resemblance to the *Lily*: It is also call'd by the *Greeks* *Σύων*, and by the *Latins*, *Syringa*, because when the Pith is taken out of its thick Branches, they are made into Pipes]. The Pipe-Tree.

The Characters are;

The Flowers consist of one Leaf, are Funnel-shap'd, but divided at Top into five Segments, and are collected into oblong specious Spikes; the Flowers are succeeded by compress'd Pods, which are scarce an Inch long, and are divided into two Cells, in which are contain'd broad, flat Seeds, which are compress'd on their Edges.

The Species are;

1. **LILAC**; *Matthioli*. The common Blue Lilac, or Pipe-Tree.

2. **LILAC**; *flore albo*. *Tourn.* The White Lilac, or Pipe-Tree.

3. **LILAC**; *flore saturatè purpureo*. *Tourn.* The Deep purple Lilac, or Pipe-Tree.

4. **LILAC**; *flore albo, foliis ex luteo variegatis*. *Cat. Plant. Hort.* The Yellow-blotch'd Lilac.

5. **LILAC**; *flore, albo foliis ex albo variegatis*. *Cat. Plant. Hort.* The White-blotch'd Lilac.

6. **LILAC**; *folio ligustri*. *Tourn.* Lilac, with Privet Leaves, falsely call'd, The Persian Jasmine.

7. **LILAC**; *laciniato folio*. *Tourn.* Lilac, with cut Leaves, falsely call'd, The Cut-leav'd Persian Jasmine.

The three first Sorts do commonly grow eighteen or twenty Feet high, and are very great Ornaments to Quarters of flowering Trees in the Spring during their flowering Season, if rightly dispos'd amongst Trees of the same Growth. The first and second Sorts are more common than the third; but the third is much preferable to the second: The Flowers of that growing much closer upon the Bunches, and are of a finer Purple Colour, and the Trees generally produce them in greater Quantities; so that this, and the white Sort, being regularly intermix'd, do afford an agreeable Variety, tho' the second may be admitted to add a Lustre to the other.

These Plants are easily propagated by Suck-

ers, which they send forth in great Plenty from the old Plants: These should be taken off in *October*, and planted into a Nursery, where they may remain three or four Years; after which time they will be fit to transplant into the Wilderness, where they are to continue: They will require no other Culture than to dig the Ground about them every Year, and take off the Suckers which are produc'd from their Roots; which, if suffer'd to remain, would starve the old Plants, and grow up into an irregular Thicket.

They will grow in almost any Soil or Situation, but do commonly flower best in that which is dry; for though a strong, moist Soil will cause them to grow more vigorously, yet they are seldom so productive of Flowers as in a dry Soil, which is generally the Case with most other Plants.

The two variegated Sorts are preserv'd by some Persons, who delight in strip'd Plants, as Curiosities, but they have no great Beauty in them; for in the Summer-time, when these Plants are free of Growth, their white and yellow Blotches do not appear very plain: and when they do, it appears more like a Distemper in them, than any real Beauty. These may be propagated by budding or inarching them upon the common Sort.

The Privet-leav'd Lilacs are of humbler Growth than those before mention'd, seldom rising above six or seven Feet high, but are very great Ornaments in small Wilderness-Quarters of flowering Shrubs, where being intermix'd with other Shrubs of the same Growth, they afford an agreeable Prospect. These produce their Flowers in much longer and slenderer Bunches than the other Sorts, and have a more agreeable Scent.

They may be propagated from Suckers as the former; but as they seldom produce them in such Plenty, so the most expeditious Method is, to propagate them by Layers, which will take Root in one Year fit to transplant: and the Plants thus rais'd, will be much better rooted than those produc'd by Suckers, and are not so subject to send forth Suckers from their Roots.

The Cut-leav'd Sort differs from the other in no other respect but in having its older Leaves deeply cut in: They are both very hardy, and will grow in almost any Soil or Situation, and may be train'd up to regular Heads, if rightly manag'd while young.

LILIO-ASPHODELUS; [so call'd, because this Plant partakes both of the *Lily* and *Daffodil*.] The Asphodel or Day Lily.

The Characters are;

It hath a Root like Asphodel (or Kingspear); the Flower consists of one Leaf, which is deeply cut into six Segments, and expands in Form of a Lily; the Flower is succeeded by an oval Fruit, which contains several roundish Seeds.

The Species are;

1. **LILIO-ASPHODELUS**; *luteus*. *Park. Par.* The Yellow Day Lily.

2. **LILIO-ASPHODELUS**; *punicus*. *Park. Par.* The Red Day Lily.

These

These Plants are very common in most of the old *English* Gardens, the first is often call'd by the Gardeners, the *Yellow Tuberosa*, from its having a very agreeable Scent; but the other is called the *Day Lily*, or the *Tuberosa Orange Lily*, in most Places.

They are both very hardy Plants, and will multiply exceedingly, if suffered to remain two or three Years undisturbed, especially the red Sort, which sends forth great Quantities of Off-sets from the old Plants, by which they may be easily propagated: The best Time to transplant their Roots is in *September* or *October*, after their Leaves are decay'd, (tho' they may be removed at almost any time, provided they are taken up with Care, and not kept too long above Ground) they are proper for large Borders in a Pleasure Garden, or to plant under Trees in Avenues, where they will thrive and flower very well; but they are too large for small Flower Gardens, and afford Harbour for Snails and other Vermin, for which Reason they should not be admitted too near choicer Plants.

They will grow in almost any Soil or Situation; the yellow Sort produces its Flowers in *May* and *June*, and the red Sort comes about a Month later; their Flowers are of a short Duration, seldom continuing above two Days, but are succeeded by fresh Flowers for near a Month successively; but the yellow Sort commonly continues longer in Flower than the other, and the Flowers are smaller, and of longer Duration.

LILIO-FRITILLARIA; vide Fritillaria.

LILIO-NARCISSUS [is so call'd, because it resembles both these Plants.] Lily-Daffodil.

The Characters are;

It hath a coated, bulbous Root; the Flower is shap'd like a Lily, consisting of six Leaves, and is cover'd with a membranaceous Sheath like the Narcissus; the Fruit succeeds the Flower in the same Form of the Narcissus, is oblong or roundish, and divided into three Cells, which are fill'd with roundish Seeds.

The Species are;

1. LILIO-NARCISSUS; *Indicus, saturato colore purpurascens.* Mor. Hist. The Lily-Daffodil, of a deep Purple-colour.

2. LILIO-NARCISSUS; *Indicus, flora albo, exterius rubente.* Tourn. Indian Lily-Daffodil, with a white Flower, which is reddish on the Outside.

3. LILIO-NARCISSUS; *polyanthus, flore incarnato, fundo ex luteo albescente.* Sloan. lat. Many-flower'd Lily-Daffodil, with a Carnation Flower, having a whitish yellow Bottom, commonly call'd in the *West Indies*, Red Lily.

4. LILIO-NARCISSUS; *Japonicus, rutilo flore.* Mor. Hist. The Japan Lily-Daffodil, commonly called the *Guernsey Lily*.

5. LILIO-NARCISSUS; *folio latissimo, floribus niveis inodoris.* Tourt. Lily-Daffodil, with a very broad Leaf, and snowy Flowers without Scent.

6. LILIO-NARCISSUS; *Indicus, Narcissus Liliflorus, aureus, striis, argenteis pictus, flori-*

bus amplis, cernuis gemellis, caule magno cepae fistuloso. Pluk. Ph. Indian Lily-Daffodil, with ample Gold-colour'd Flowers spotted with Silver, and a large hollow Stalk.

7. LILIO-NARCISSUS; *Indicus, flore incarnato, lineis albis striato, odorato.* Indian Lily-Daffodil, with a Carnation Flower strip'd with white Lines, and of a sweet Scent, commonly called the *Bella donna Lily*.

8. LILIO-NARCISSUS; *luteus, autumnalis, minor.* Tourn. The lesser yellow Autumnal Lily-Daffodil, commonly call'd the *Autumnal Narcissus*.

The first of these Plants is very rare at present in *England*; but in *Italy* it is very common, especially about *Florence*, where they bring large Bunches of the Flowers into the Market and sell them for Flower-Pots, by the Name of *Narcissus Bella-donna*; and is probably one of the first Sorts of this Flower which was brought into *Europe*. This Plant thrives so well in *Italy*, as to need no other Culture than the common Lily, and although it does not flower until *August*, yet it commonly produces good Seeds in that Country, from which they propagate them in great Plenty; but with us they require to be planted in Pots fill'd with light fresh Earth, and in Winter they must be shelter'd to prevent their Leaves being destroy'd by the Frost, which if it does not quite kill their Roots, will so weaken them, as that they will not recover Strength to flower in several Years after, though you should attend them with ever so much Care. This Plant produces its Flowers in *September*, and the Green Leaves come up soon after, and abide all the *Winter* and *Spring* until *May*, at which time they decay, soon after which the Roots should be transplanted, for if they are let stand till *July*, they will have sent forth new Fibres, when it will greatly injure the Roots if they are disturb'd.

The second Sort is less common in *England* than the first; this seldom produces more than one Flower upon each Stalk, which is smaller than those of the former; but nearly of the same Figure; this is also cultivated as the former, and flowers about the same Season.

The third Sort is very common in *Barbadoes*, *St. Christopher's*, and the other warm Islands of the *West Indies*; but at present it is very rare in *England*: This Sort is much tenderer than either of the former, and will require to be kept in a Hot-bed of Tanner's Bark, in order to produce Flowers. The Roots of this Plant may be very easily brought from the *West Indies*, if they are taken up immediately after their Leaves decay, and sent over in a Box dry, for if they are planted in Tubs of Earth, they generally rot in their Passage, by receiving too great Quantities of Water.

The fourth Sort is suppos'd to come originally from *Japan*, but has been many Years cultivated in the Gardens of *Guernsey* and *Jersey*; in both which Places they seem to thrive as well as if it was their native Country; and from those Islands their Roots are sent annually to the Curious in most Parts of *Europe*, and are commonly call'd *Guernsey Lilies*; the

Roots

Roots of this Plant are generally brought over in *July* and *August*, but the sooner they are taken out of the Ground after their Leaves decay, they are the better: for although the Roots which are taken up when their Flower-stems begin to appear, will flower, yet their Flowers will not be so large, nor will their Roots be near so good after, as those which were removed before they had sent out fresh Fibres.

When these Roots come over they should be planted in Pots filled with fresh, light, sandy Earth, mix'd with a little very rotten Dung, and placed in a warm Situation, observing now and then to refresh the Earth with Water; but by no means let them have too much Wet, which would rot their Roots, especially before they come up: About the Middle of *August*, such of the Roots as are strong enough to flower, will begin to shew the Bud of their Flower-stem (which is commonly of a red Colour) therefore you should remove these Pots into a Situation where they may have the full Benefit of the Sun, and may be shelter'd from strong Winds; but by no means place them too near a Wall, nor under Glasses, which would draw them up weak, and render them less beautiful: At this Season they should be gently refresh'd with Water, if the Weather be warm and dry; but if it should prove very wet, they should be screen'd from it.

When the Flowers begin to open, the Pots should be removed under Shelter, to prevent the Flowers from being injured by too much Wet; but they must not be kept too close, nor placed in a Situation too warm, which would occasion their Colour to be less lively, and hasten their Decay. The Flowers of this Plant will continue in Beauty (if rightly manag'd) a full Month, and though they have no Scent, yet for the Richness of their Colour, they are justly esteem'd in the first Rank of the Flowery Race.

After the Flowers are decay'd, the Green Leaves will begin to shoot forth in Length, and if shelter'd from severe Cold, will continue growing all the Winter; but they must have as much free Air as possible in mild Weather, and be cover'd only in great Rains or Frosts, for which Purpose a common Hot-bed Frame is the properest Shelter for them, under which if they are placed, the Glasses may be taken off constantly every Day in dry open Weather, which will encourage the Leaves to grow strong and broad, whereas when they are placed in a Green-house, or not exposed to the open Air, they will grow long and slender, and have a pale, weak Aspect, whereby the Roots will become weak, so that it seldom happens that they produce Flowers under such Management.

These Roots should be transplanted every other Year toward the latter End of *June*, or the Beginning of *July*, and planted into fresh Earth (but they should not be oftener removed, for that would retard their Flowering). The Off-sets should also be taken off and planted into separate Pots, which in three

Years time will produce Flowers, so that after a Person is once stock'd with these Roots, they may increase them, so as to have a Supply of blowing Roots, without being at the Trouble or Expence of sending to *Guernsey* every Year for fresh Roots; and the Roots preserved here, will flower stronger than those which are usually brought from thence, for the Inhabitants of those Islands are not very curious in cultivating these Roots: Their usual Method is to plant them at a great Distance in a Bed of common Earth, where they let them remain for many Years, in which time they produce such a Number of Off-sets, that many times one single Cluster has contain'd above a Hundred Roots; by which means those which grow on the Inside, are so much compressed by the outer Roots, that they are perfectly flatted, and from the Number of Roots they are all rendered weak, and so unfit to produce such large Stems of Flowers, as those which have grown single and are of a spherical Figure.

But when a Person has got a large Number of these Roots, it will be troublesome to preserve them in Pots, therefore you should prepare a Bed of the following Earth, in some well-shelter'd Part of the Garden, *viz.* Take a third Part of fresh Virgin Earth upon a Pasture Ground, which is light, then put near an equal Part of Sea Sand, to which you should add rotten Dung and sifted Lime-rubbish of each an equal Quantity: With this Earth (when well mix'd and incorporated) you should make your Bed about a Foot thick, raising it about four or five Inches above the Surface of the Ground, if the Situation be dry; but if the Ground be wet, you should raise it eight or nine Inches higher: In this Bed about the Beginning of *July* (as was before directed) you should plant the Roots about six Inches asunder each Way, and in the *Winter*, when the Frost begins, you should either cover the Bed with a Frame, or arch it over and cover it with Maps and Straw, to prevent their Leaves from being pinch'd with Cold; but in the *Summer* the Covering may be intirely removed, and the Bed kept constantly clear from Weeds, observing to stir the Surface of the Earth now and then, and every Year when the Leaves are decay'd, you should sift a little fresh Earth over the Beds, to encourage the Roots. In this Bed the Roots may remain until they are strong enough to produce Flowers, when they may be taken up and planted into Pots as was before directed, or suffered to remain in the same Bed to flower.

The Roots of these Plants do not flower again the succeeding Year (as in many other Sorts of Bulbs) but if their Bulbs contain two Buds in their Center, as is often the Case, they very often flower twice within the Compass of three Years, after which the same individual Root does not flower again; but only the Off-sets from it.

The fifth Sort is at present very rare in *England*, and only to be found in some very curious Gardens; this is much tenderer than the

the last, and requires to be managed as was directed for the third Sort, with which Management it will thrive exceeding well, but you must observe never to water these Roots after their Leaves are decay'd (which is soon after *Christmas*) until they shoot out again in *April*, for Moisture at that Season, while they are in an unactive State, is very subject to rot them: This Plant produces its Flowers commonly in *March*, and the green Leaves appear soon after.

The sixth Sort is also tender, and requires to be kept in a warm Stove in Winter; but in the Summer-season it will bear to be expos'd to the open Air, in warm, dry Weather; this Sort should be treated in the same Manner as the last, with this Difference only, viz. that it may be preserved without being plung'd in Tanners Bark: This Plant produces its Flowers nearly about the same time with the last; but the Flowers of this are much more beautiful.

The seventh Sort was brought from *Portugal*, where they are in great Plenty, and is by the Inhabitants call'd *Bella-donna*; but this is a very different Plant from that which the *Italians* call by that Name, the Flowers of this Kind being larger and paler colour'd than those of the *Italian* Sort, and seldom have more than three or four upon one Stem, whereas the other has often ten or twelve. This Plant is propagated in the same manner as was directed for the *Guernsey* Lily (to which I refer the Reader, to avoid Repetition) the Flowers of this Plant are always produced about the same time as the *Guernsey* Lily, but are not near so beautiful.

These Plants do not increase very fast in our Climate, for which Reason a curious Person should be furnished with several Roots of each Kind from Abroad, in order to have some Flowers every Year, for they seldom blow two Years together (as was before observed) nor does the same Root flower more than twice, which is commonly within three Years; so that where there are not six or eight Roots of each Sort, it can't be expected to have Flowers very often, notwithstanding no Art or Care be wanting in their Culture; for in their native Countries they are not constant Flowerers.

The eighth Sort is a very hardy Plant, and increases very fast from Off-sets: The Season for transplanting these Roots, is any time from *May* to *July*, after which it will be too late to remove them, for they will begin to push out new Fibres by the Middle of that Month, if the Season be moist, and many times they flower in *August*; so that if they are then transplanted it will spoil their flowering: This Plant will grow in almost any Soil or Situation, but it will thrive best in a fresh, light, dry Soil, and in an open Situation, i. e. not under the Dripping of Trees, nor too near to Walls. It is commonly called by the Gardeners the *Yellow Autumnal Narcissus*, and is usually sold by them with *Colchicums*, &c. for Autumnal Ornaments to Gardens, for which Purpose this is a very pretty Plant.

LILIUM [takes its Name of *λίον*, *smooth*, *polished*, because its Leaves are, as it were,

polished; or of *λίον*, which signifies the same Thing.] The Lily.

The Characters are;

It hath a bulbous Root, consisting of several fleshy Scales adhering to an Axis; the Stalk is greatly furnished with Leaves; the Flower is compos'd of six Leaves, and is shap'd somewhat like a Bell; in some Species the Petals are greatly reflex'd, but in others but little; from the Center of the Flower rises the Pointal, which becomes an oblong Fruit, that is commonly triangular, divided into three Cells, and full of compress'd Seeds, which are border'd, lying upon each other in a double Row.

The Species are;

1. *LILIUM*; *album*, *flore erecto* & *vulgare*. C. B. P. Common white Lily.
2. *LILIUM*; *album*, *inodorum*, *flore pleno*. H. R. Par. The double white Lily, without Smell.
3. *LILIUM*; *album*, *floribus dependentibus* *five peregrinum*. C. B. P. The foreign white Lily, with hanging Flowers.
4. *LILIUM*; *album*, *lato caule multiflorum*. H. R. Par. The white Lily, with broad flat Stalks, bearing many Flowers.
5. *LILIUM*; *album*, *vulgare*, *foliis ad limbos flavescentibus*. H. L. Common white Lily, with strip'd Leaves.
6. *LILIUM*; *album*, *flore lineis purpureis variegato*. D. Marchant. The white Lily, strip'd with Purple.
7. *LILIUM*; *purpureo-croceum*, *majus*. C. B. P. The common Orange Lily; *vulgô*.
8. *LILIUM*; *pumilum cruentum*. Park. Par. The dwarf red Lily.
9. *LILIUM*; *rubrum*, *multiplaci flore*. Park. Par. The double red Lily.
10. *LILIUM*; *bulbiferum*, *angustifolium*. C. B. P. Narrow-leav'd bulbiferous Lily, commonly called the Fiery Lily.
11. *LILIUM*; *floribus reflexis*, *montanum*. C. B. P. The Imperial Martagon.
12. *LILIUM*; *floribus reflexis*, *albis*, *punctatis*. C. B. P. The white spotted Martagon.
13. *LILIUM*; *floribus reflexis*, *albis non punctatis*. C. B. P. The white Martagon, without Spots.
14. *LILIUM*; *floribus reflexis*, *montanum*, *flore pleno*. H. R. Par. The double flowering Martagon.
15. *LILIUM*; *flavum*, *angustifolium*, *flore flavo*, *maculis nigris distincto*. C. B. P. The spotted Canada Martagon; *vulgô*.
16. *LILIUM*; *miniatum*, *odorum*, *angustifolium*. C. B. P. The scarlet Martagon of Pompony; *vulgô*.
17. *LILIUM*; *Byzantinum*, *miniatum*, *polyanthos*. C. B. P. The scarlet Martagon, with many Flowers.
18. *LILIUM*; *Byzantinum*, *miniatum*. C. B. P. The common scarlet Martagon.
19. *LILIUM*; *Byzantinum*, *flore flavo*. C. B. P. The yellow Martagon of Constantinople.
20. *LILIUM*; *purpureo-croceum majus*, *foliis ex luteo eleganter variegatis*. The Orange Lily, with beautiful variegated Leaves.

There are several other Varieties of these Plants which are preserved in the curious Gardens Abroad, many of which were formerly

merly in *England*, as may be gather'd from *Parkinson* and several other Writers upon curious Flowers) but these which are here mentioned are all the Sorts I can at present find in the Gardens near *London*; though it is very probable many of the other Sorts may be found in some old Gardens of this Kingdom, which were formerly possess'd by curious Delighters in Flowers; for as most of these Sorts are very hardy, and will grow with little Culture, so when they are once fix'd in a Garden, they are not very subject to decay, unless their Roots are destroy'd, but will abide many Years without any Care; therefore from such Places there may be Hopes of retrieving those Flowers again.

The common white *Lily* is so well known, that it will be needless to say any thing of it in this Place: The second Sort with double Flowers, is by some Persons preserv'd by way of Curiosity; but there is no Beauty in it, for the Flowers seldom open, and have no Scent, so that it scarcely deserves a Place in a good Garden: The third Sort with pendulous Flowers, is sometimes called the *White Constantinople Lily*, from whence it was formerly brought, but is now become almost as plenty as the common white *Lily* in many Gardens; this differs from the common Sort, in having slenderer Stems which are of a purplish Colour, and the Petals of the Flowers are narrower, and the Flowers are somewhat less, and always hang down.

These Plants are all very hardy, and require no other Culture, than to be taken up every other Year (in *July* after the Flowers are decay'd) and pull off the Suckers from them, which if suffer'd to remain on, would starve the old Roots, and cause them to flower very weak; but they should not be kept long out of the Ground, nor removed after their Leaves appear above Ground, both which will weaken the Roots so much, that they will not flower the following Summer. They increase greatly from Off-sets, whereby they are become so common as to be little esteem'd.

The fourth Sort seems to be a Variety from the first: The Stalks of this are very broad, and have generally double the Number of Flowers upon each Stalk as the common, which are equally as large and fair: but whether it will constantly preserve this Difference, I can't positively affirm, tho' for three Years past I have observ'd them to remain the same in two or three different Gardens. This is equally hardy as the common Sort, and is increas'd the same way.

The *Strip'd-leav'd Lily* is a great Ornament to Flower borders during the Winter-season; their beautiful variegated Leaves always appearing in *September*, and are continu'd all the Winter, making a fine Appearance in the Depth of Winter, when few other Plants are in Beauty: For which Reason this Plant hath been greatly propagated of late Years. This is increas'd as the common Sort, but the Roots should always be planted in a fresh, light Soil, in which they will thrive exceedingly: But if you make the Ground rich with Dung, it will certainly destroy them, as will also a very

wet or strong Soil. The Season for transplanting these Roots, is the same with the common Sort.

The *White Lily strip'd with Purple*, has not been many Years brought into *England*. Of this Kind there are two Sorts; one of which is much more beautifully variegated than the other; both of which were obtain'd originally from Seed. These are both propagated in the same manner as the common Sort, but should be planted in a dry, sandy Soil, mix'd with a little Lime-Rubbish, and expos'd to the Morning Sun: In which Soil and Situation they will flower exceeding well, and their Stripes will be much deeper colour'd than when they are planted in a richer Soil, and their Roots will make a better Increase.

The *Orange Lily* is so well known, that it is needless to say any thing of it here. That Sort which is commonly call'd the *Double Orange Lily*, differs from the common only in having two or three more Petals in each Flower, which is not constant, but very apt to degenerate to the common Sort, so that it is scarcely worth preserving, unless for Variety Sake. These are propagated by Off-sets from the old Roots, which are commonly sent forth in great Plenty, and therefore the Roots should never remain more than two Years unremov'd, because the Number of Off-sets would greatly weaken them, and render their Flowers small, and fewer in Number. These may be transplanted any time from the Beginning of *August* to the End of *October*, for they do not shoot again soon after their Stems are decay'd, as doth the *White Lilies*; but, on the contrary, remain till *February* before they appear above-ground. They will grow in almost any Soil or Situation, but best in a dry, light Soil, and an open Exposure.

The *bulbous fiery Lily*, produces its Flowers three Weeks before the common Sort, and is much more beautiful. This Sort was formerly more common than at present, as were several other Sorts of *Lilies*: It is equally as hardy as the common Sort, and doth increase much faster; for upon the Flower-stems, between the Wings of the Leaves and the Stalk, are produc'd small Bulbs; which when taken off, and planted, do become strong Roots in two Years, so that it may be render'd very plentiful in a short time, were People to plant all their Increase. This requires the same Soil and Culture as the *Orange Lily*; as doth also the *Dwarf Red Lily*, which is nearly allied to this. They will grow under Trees, which renders them proper to plant in Avenues; where, when intermix'd amongst other hardy Flowers of the same Growth, they will make a beautiful Appearance, and are very useful to furnish Basins and Flower-Pots for Halls, Chimnies, &c. during the Season of Flowering.

The *Imperial Martagon* is very common in most old Gardens in *England*. This is equally as hardy as the common *Lily*, and requires no other Culture: The Flowers are produc'd at the latter End of *May*, and do make a very handsome Figure in the Middle of large Borders

ders in a Flower-Garden, but the Scent is too strong to be born by many People, for which Reason they should never be plac'd in Basins of Flowers in a Room, nor be planted too near the House.

The *White*, and the *White-spotted Martagons*, do flower about the Middle of *June*, or sometimes later: These produce a greater Number of Flowers upon a Stalk than the former, but the Flowers are seldom so large, and commonly grow more sparsely on the Stalks. These have a strong Scent, but not quite so disagreeable as the former. The Roots of these Plants should be transplanted soon after their Stems decay; for if they are taken up late in the *Autumn*, they seldom produce their Flowers strong the succeeding *Summer*. These require a fresh, light Soil, and an open Situation; if they are suffer'd to remain three Years undisturb'd, they will make a good Increase, and produce strong Flowers.

The *Double Martagon* requires the same Soil and Culture with the two last: This produces a large Quantity of fair double Flowers upon each Stem, which renders it very valuable: The Flowers do commonly appear the Beginning of *July*, or somewhat later.

The *Spotted Canada Martagon*, is much tenderer than any of the former. The Roots of this Sort should be planted in a warm Border, where they may be protected from severe hard Frosts, by covering the Surface of the Ground with Peas-haulm, &c. It must also have a fresh, light, dry Soil, and should be planted at least six Inches deep; for when the Roots lie near the Surface, they are often injur'd by Frosts in Winter.

This Plant was originally brought from *Canada* by the *French*, from whom we were first supply'd with it; but since we have receiv'd many Roots of it from *Virginia*, where it also grows in great Plenty in the Woods. The Flowers of this Kind are almost as large as those of the *Orange Lily*, but are more reflex'd, and of a fine yellow Colour, spotted with Black: This flowers in *July*.

The *Red Martagon of Pompony*, is one of the most beautiful Sorts of all the *Martagons* which I have yet seen, and produces the greatest Number of Flowers upon a Stem of any of the Kinds, (especially when the Roots are strong, and have remain'd undisturb'd two or three Years) when they will many times have upward of fourscore Flowers upon a Stem: The Flowers are not so large, nor so deep-colour'd as the *Scarlet Martagon*, but rather of a yellowish-red Colour, and spotted with black: This flowers commonly the latter End of *May*, or the Beginning of *June*.

The Roots of this Plant are tender, and will not endure to be often transplanted, for that will destroy them: The best Season to remove them, is soon after their Stems decay; when they should never be kept long out of the Ground, but planted again as soon as possible. These require a fresh, light, sandy Soil, but will by no means thrive in a rich, moist Soil, which will cause 'em to rot; and they must have an open Exposure, for if they

are over-hung by Trees, they will not thrive. This should also be planted as deep in the Ground as the *Canada Martagon*, for the same Reason as was before observ'd on that.

The *Scarlet Martagon*, with many Flowers, is in some curious Gardens very common, it being a very hardy Plant in respect to Cold, which it endures very well, and is easily propagated from Off-sets, as the other Sorts, but must have a warm, light, dry Soil, which should not be dung'd, nor overshadow'd with Trees, either of which will cause the Roots to decay. This is a very beautiful Flower, and very proper to adorn the Borders of large Flower-Gardens. It produces its Flowers in *July*, after most of the other Sorts, which are of a deep-scarlet Colour, growing many upon a Stalk.

The other *Scarlet Martagon* is also common in some Gardens, but is not so much valu'd as the last; the Flowers are not so deep colour'd, and it seldom has more than six or eight upon a Stem. This flowers much about the same Time as the former, and requires the same Soil and Culture.

The *Yellow Martagon of Constantinople* is very rare in *England* at present, and only to be found in the Gardens of some curious Collectors of these Beauties: This requires much the same Culture as the two last-mention'd, but must not be often remov'd, which will not only weaken the Root, but also prevent its flowering. When the Roots of this kind have been standing three Years upon a good fresh dry Soil, I have observ'd above forty Flowers upon a Stem, which have made a very beautiful Appearance. This flowers about the same Season as the former.

The *strip'd Orange Lily* is a very beautiful Plant, and was a few Years since sold at a very great Price, but of late it hath been more common, as being easily propagated by Off-sets; so that when it is once obtain'd, it may be soon increas'd to what Number you please, provided you plant it in a dry Soil, and a warm Situation. This beautiful Plant was, some Years since, accidentally produc'd from Seeds of the common *Orange Lily*, which were shed upon a Border, where they were suffer'd to grow, until this Plant appear'd with its fine variegated Leaves; which the Owner, upon Discovery, mark'd, and, at a proper Season, remov'd into a better Situation, where it thrived and increas'd so well, as in a few Years to be spread into divers Parts of the Kingdom. This Plant must never be planted in a rich Soil, which will greatly diminish its Beauty, and many times cause the Roots to decay.

All the Sorts of *Lilies* and *Martagons* may be propagated by sowing their Seeds; by which Method some new Varieties may be obtain'd, provided the Seeds are sav'd from the best Sorts, especially the *Martagons*, which are more inclinable to vary than the other *Lilies*. The manner of sowing them is as follows:

You must be provided with some square Boxes about six Inches deep, which should have Holes bored in their Bottoms, to let the

Wet

Wet pass off; these Boxes should be fill'd with fresh light sandy Earth, and in the Beginning of *August*, soon after the Seeds are ripe, you must sow them thereon pretty thick, covering 'em over with light sifted Earth about half an Inch; then place the Boxes where they may have the Morning Sun only, observing, if the Season should prove dry, to refresh 'em often with Water, as also to pull out all Weeds which may be produc'd: In this Situation the Boxes should remain until *October*, when you must remove 'em where they may have as much Sun as possible, as also be screen'd from the cold North and East Winds during the Winter Season: But in the Spring of the Year, about the Beginning of *April*, you must remove the Boxes into their former Position; for now the young Plants will appear above-ground, which are impatient of too much Heat: besides, the Earth in the Boxes will dry too fast at this Season, if expos'd to the full Sun at Noon. You must also observe at this Season to keep them intirely clear from Weeds, as also to refresh them gently with Water if the Season should prove dry; in this Place you should let the Boxes remain until the Beginning of *August*, at which Time you should prepare some Beds of the above-mention'd fresh light Earth, which must be levell'd very even: Then take the Earth out of the Boxes, together with the small Bulbs, and strew it equally over the Beds, covering it over about half an Inch thick with fine-sifted Earth: And if the Season should prove very hot and dry, you would do well to shade the Beds in the Middle of the Day from the great Heat of the Sun, and refresh them now-and-then with Water.

You must also observe to keep them intirely clear from Weeds: And if the following Winter should prove very cold, you must cover the Beds with Peas-haulm, or some other light Covering, to keep out the Frost, which would prejudice the Roots, if suffer'd to enter deep into the Ground, (especially while they are so young): but you must never let the Covering remain on in mild Weather, which would also be very injurious to them.

In *February*, when the hard Frosts are over, you should gently clear off the Earth upon the Surface of the Beds, (which, during the Winter-season, will often have contracted a Mossiness), and sift a little fresh Earth equally over the Beds, which will greatly encourage the Roots: But in doing this, you must be very careful not to stir the Ground so deep as to injure the Roots: Nor should you defer doing it too late, lest the Shoots should be coming up, which, by this Operation, might be broken, and greatly hurt. And as the Season advances, so you must be careful to clear them from Weeds, and in dry Weather to water them; and in very hot Days, if you shade 'em from the Sun, it will be of great Service to them: but this need not be done 'till the Latter-end of *April*, or the Beginning of *May*, when the Season is sometimes very hot and dry.

When their Leaves are quite decay'd, you should stir the Surface of the Beds again, (but do not go too deep) which will prevent the Weeds from growing very fast, and be of Service to the Roots; and in *September* you must sift some more fresh Earth over the Beds about half an Inch thick: and in Winter and Spring you must manage them as was directed for the preceding Year.

In *September* following these Roots will require to be transplanted to a greater Distance, when you must prepare some Beds of the same fresh light Earth, as was before directed, making them level; then take up the Roots, and transplant them into the Beds, placing them about eight Inches asunder, observing to put the Roots with their Buds uppermost, and about four Inches below the Surface.

This Work should be done when the Weather is moist; for if the Roots are transplanted in a very dry Season, and there doth not happen Rain soon after, they will take a Mouldiness, which many times rots them.

You must also observe (as was before directed) to keep the Beds intirely clear from Weeds: And in Winter, if the Frost should be very severe, you must cover them with Peas-haulm, to prevent the Roots from being injured thereby: And in the Spring you should take off the Earth from the Surface of the Beds, as before, laying some fresh thereon, and so continue the Summer and Winter's Work, as before.

The second Year after being planted in these Beds the strongest Roots will begin to flower; at which Time, if you observe any peculiar Varieties, you should put down a Stick by each of those Roots, to mark them; which may be taken up when their Leaves are decay'd, and remov'd into the Borders of the *Flower-Garden*, or transplanted into other Beds at a greater Distance, to encourage them to flower strong. But you can't be a Judge which of those will be good by their first Flowers, therefore you should never reject any of them until they have flower'd two or three Years; for, many times, some of these Flowers will make but a mean Appearance the first Year, and afterwards become fair handsome Flowers, when they have obtain'd Strength; so that you should suffer all such, as you are not assured of their Worth, to remain undisturb'd two or three Years, that you may be ascertain'd which of them are worthy preserving; which should be remov'd into the *Flower-Garden* at a proper Season: but the ordinary ones may be rejected, or planted in shady Outer Walks, where, tho' they are mean Flowers, yet they will appear well enough in such Places.

LILIUM CONVALLIUM: Lily of the Valley, or May Lily.

The Characters are;

The Flower consists of one Leaf, is shap'd like a Bell, and divided at the Top into six Segments: The Ovary becomes a soft globular Fruit, containing several round Seeds.

The

The Species are ;

1. *LILIUM CONVALLIUM* ; *album*. C. B. P. Common Lily of the Valley, with white Flowers.

2. *LILIUM CONVALLIUM* ; *flore rubente*. C. B. P. Lily of the Valley, with reddish Flowers.

3. *LILIUM CONVALLIUM* ; *latifolium, flore pleno variegato*. Tourn. Broad-leav'd Lily of the Valley, with a double variegated Flower.

There are some other Varieties of this Plant, which are preserv'd in some curious Botanick Gardens abroad, but these are all the Sorts I have observ'd in the *English* Gardens. The first Sort is very common in shady Woods in divers Parts of *England*. The second is a Variety of the first, differing only in the Colour of the Flower ; which Difference it constantly maintains when cultivated in Gardens.

They delight in a moist shady Situation, where they will thrive exceedingly, and produce a large Quantity of Flowers. The best Time for transplanting these Roots is early in the Spring, just before they begin to shoot.

The Double Sort was brought from *Holland* some Years since ; but whether it was obtain'd from Seeds originally, or found by Accident, I can't say. This may be propagated by parting the Roots in the Spring, in the same manner as the former.

LILIUM PERSICUM ; *vide* Fritillaria.

LILIUM SUPERBUM ; *vide* Methonica.

LIME-TREE ; *vide* TILIA.

LIMON, [so call'd of *Aquar* a Meadow, because the Leaves of this Tree are of a green Colour, as is likewise the Fruit before it comes to Maturity.] The Lemon-Tree.

The Characters are ;

It hath large stiff Leaves like the Citron, without any Appendage at the Bottom : The Flower consists of many Leaves, which expand in Form of a Rose : The Fruit is almost of an oval Figure, and divided into several Cells, in which are lodg'd hard Seeds surrounded by a thick fleshy Substance, which, for the most part, is full of an acid Juice.

The Species are ;

1. LIMON ; *vulgaris*. Ferr. Hesp. The Common Lemon.

2. LIMON ; *dulcis*. Ferr. Hesp. The Sweet Lemon.

3. LIMON ; *acris*. Ferr. Hesp. The lesser Soure Lemon.

4. LIMON ; *dulci medullâ, vulgaris*. Ferr. Hesp. The common Sweet Lemon.

5. LIMON ; *Pyri effigie*. Ferr. Hesp. The Pear-shap'd Lemon.

6. LIMON ; *Imperialis*. Ferr. Hesp. The Imperial Lemon.

7. LIMON ; *Adami Pomum commune*. Ferr. Hesp. Lemon, commonly call'd Adam's Apple.

8. LIMON ; *spineolas*. Ferr. Hesp. The Wild Lemon, *vulgô*.

9. LIMON ; *striatus, vulgatiôr*. Ferr. Hesp. The Furrow'd Lemon.

10. LIMON ; *citratus, altero factus*. Tourn. The Childing Lemon ; *vulgô*.

11. LIMON ; *qui Lima acris dicitur*. Ferr. Hesp. The Soure Lime.

12. LIMON ; *qui Lima dulcis dicitur*. Ferr. Hesp. The Sweet Lime.

13. LIMON ; *vulgaris, foliis ex luteo eleganter striatis*. The Gold-strip'd Lemon.

14. LIMON ; *vulgaris, foliis ex albo variegatis*. The Silver-strip'd Lemon.

There are some other Varieties of these Trees in the curious Gardens abroad, from whence we may expect to be supply'd with them all, since there are every Year large Quantities of these Trees brought over from *Italy*, where the Gardeners are as fond of any new Kinds to supply their Customers with, as our Country-men are of new Sorts of Fruit. But since these Varieties are annually increas'd from Seeds, like other Fruits, so it would be needless to attempt an Account of them all, because in a very short Time many new Varieties may be produc'd.

The Fruit of the four first Sorts are generally brought over from *Lisbon* every Year in great Plenty, and are sold promiscuously in *London* in the *Winter* and *Spring*, as are great Numbers of the Trees, which are annually brought over from *Italy*.

The fifth, sixth, and seventh Sorts are preserv'd, for their Variety, in many curious Gardens ; but the fifth is very uncommon in *England* at present.

The sixth is a very large beautiful Sort, and of an agreeable Flavour : This has produc'd very good Fruit in divers Gardens in *England*, which has been as well-tasted as any of those which are brought over from *Italy*.

The seventh Sort is somewhat tenderer than the other, and requires a warmer Situation in *Winter* ; otherwise the Fruit is very subject to drop off at that Season.

The eighth Sort is commonly call'd The Wild Lemon, (though improperly) because it has many Thorns upon the Branches ; but this will produce very fair Fruit in this Kingdom. The Flowers of this Kind are generally of a reddish or purplish Colour on the Outside before they open, but afterwards fade, and change to a paler. The Leaves of this are also of a very deep Green, and gently serrated upon their Edges.

The Furrow'd Lemon is in divers Gardens in *England*, where the Fruit very often ripens well, and is chiefly kept for Variety, as differing from the Common Sort, in having deep Furrows in the Fruit ; but it is not so good for Use, nor does the Fruit produce so much Juice as the Common Sort.

The Childing Lemon is also preserv'd as a Curiosity, the old Fruit commonly producing a young one from its Centre.

The two Sorts of Limes are likewise in many Gardens in this Kingdom ; but these require the same Degree of Warmth as the *Sbaddock Orange*, in order to produce Fruit ; for if they are placed among *Orange-Trees*, the Fruit will fall away in *Winter*, and come to nothing.

The two variegated Sorts are preserv'd for their strip'd Leaves (which are greatly esteem'd by some Persons who are curious in collecting variegated Plants): But these are tenderer than the plain Sorts, and, if not duly attended in Winter, will be very apt to cast their Leaves, and appear very unsightly.

There is also another Sort, which produces Double Flowers; but this seems not to be very constant; for I have observ'd upon the same Tree, some Flowers Single, and others Double, at the same Time.

All these Sorts are propagated by budding or inarching them either on Stocks of Lemons or Citrons produc'd from Seeds; but they will not so readily unite on Orange Stocks; for which Reason the Citrons are preferable to either Oranges or Lemons for Stocks, as they do readily join with either Sort; and being of larger Growth, do cause the Buds of the other Sorts to shoot much stronger than if they were on Stocks of their own Kind. The Method for Raising these Stocks, and the Manner of Budding them, being already exhibited under the Article of *Aurantium*, it wou'd be superfluous to repeat it here.

The Culture of the Lemon being the same with that of the Orange-Tree, it wou'd be also needless to repeat it here; therefore I shall only observe, that the common Lemons are somewhat hardier than the Oranges, and will bring their Fruit to Maturity with us better than They will do, and require to have a greater Share of fresh Air in Winter; for which Reason they should always be placed nearer to the Doors or Windows of the Green-house: And as they generally produce stronger Shoots, so they require more Water to be given them than the Orange; but as to the tender Sorts, they must be treated with a little more Care, otherwise their Fruit will fall off in Winter, and come to nothing. These Things being fully exhibited before, I refer the Reader (as I hinted) to the Article *Aurantium*, where their Culture is fully set forth.

LIMONIUM, [takes its Name of *Λιμόνιον* a Marsh, as growing in Marshes.] Sea-Lavender.

The Characters are;

It hath a fibrose Root: The Stalks are naked, and branched: The Cup of the Flower is long and tubulose, but expanded at the Top: The Flower in some Species consists of one Leaf, but in others of several, and is shap'd like a Clove-July-flower: The Pointal, which arises out of the Flower-cup, becomes an oblong Fruit, wrapt up in the Flower-cup, as in an Husk.

The Species are;

1. **LIMONIUM**; *Maritimum, majus*. C. B. P. Common Great Sea-Lavender.

2. **LIMONIUM**; *Maritimum, majus, alterum ferotinum Narbonense*. H. R. Par. Another large late flowering Sea-Lavender of Narbonne.

3. **LIMONIUM**; *Maritimum, minus, Olea folio*. C. B. P. Small Sea-Lavender, with an Olive-Leaf.

4. **LIMONIUM**; *Anglicum, minus, caulibus ramosioribus, floribus in spicis rarius fitis*. Raii Hist. Lesser English Sea-Lavender, with

branch'd Stalks, and Flowers seldom growing in a Spike.

5. **LIMONIUM**; *Orientalis, plantaginis folio; floribus umbellatis*. T. Cor. Oriental Sea-Lavender, with Plantain Leaves and Flowers growing in an Umbel.

6. **LIMONIUM**; *peregrinum, foliis asplenii*. C. B. P. Foreign Sea-Lavender, with Spleenwort Leaves.

7. **LIMONIUM**; *Siculum, lignosum, gallas ferens & non ferens*. Bocc. Rar. Woody Sicilian Sea-Lavender.

There are several other Species of this Plant, which are found upon the Sea-coasts of Italy, Spain, and the Southern Parts of France, but these here-mention'd are all the Sorts I have observ'd in the English Gardens. The first and fourth Sorts are found upon the Sea-Coasts in divers Parts of England, especially the first, which is the most common; the other being only found in some particular Places. The second and third Sorts are pretty common in the Southern Parts of France. The fifth Sort was found by *Monf. Tournefort* in the Levant. The sixth, which is the most beautiful of all the Sorts, was found by *Mr. Ray* in great Plenty in divers Parts of Sicily; and *Clusius* observ'd it at Malaga, and about Cadiz. The seventh Sort, which grows to the Stature of a Shrub, was found in Sicily by *Pere Boccone*, and by him figur'd and describ'd in his Book of *Rare Sicilian Plants*.

The five first mention'd Sorts are pretty hardy, and will endure the Cold of our ordinary Winters very well, provided they have a sandy Soil, and a warm Situation: These may be propagated by parting their Roots towards the latter End of March. When they are planted, which should be in a light sandy Soil, you must water and shade them until they have taken Root; after which, they will require no other Culture than to keep them clear from Weeds. In July these Plants will produce beautiful Spikes or Tufts of blue or Purple-colour'd Flowers, which will continue in Perfection a long Time; and if the Season proves favourable in Autumn they will ripen their Seeds.

The sixth Sort is somewhat tenderer than the others, and must be preserv'd in Pots fill'd with fresh light Earth, and plac'd in the Green-house in hard Weather, otherwise the Cold of our Winters often destroys them: This Plant may be propagated as the former, but is not so apt to increafe; for which Reason, the best Method is, to be furnish'd with good Seeds from abroad, (for it never perfects its Seed in England), which, if sown upon a warm Border of light fresh Earth, will come up very well; and in the Summer, when the Plants have acquir'd sufficient Strength for Transplantation, they must be taken up and planted in Pots, placing them in the Shade until they have taken Root; after which, they may be expos'd to the open Air until October, when they must be remov'd into the Green-house, observing to place them where they may have as much free Air as possible in mild Weather: And during the Winter-season

season they must be frequently water'd ; but you must never give them too much at once, which is apt to rot their Roots, especially in that Season. You must also observe to pick off all decay'd Leaves, which, if suffer'd to remain on the Plants, very often infect them ; and it being pretty nice in its Culture, it will often fail, upon a small Neglect of this Kind. This Plant produces its Flowers in *July* and *August*, and, many times, continues in Beauty the greatest Part of *September*.

The seventh Sort rises to be four or five Feet high, and hath slender woody Branches ; from which, in *July* and *August*, are produc'd Spikes of small blue Flowers, which make a very handsome Appearance, (especially in a warm Season, when their Flowers open kindly) and continue in Beauty a long time.

This Plant is propagated by planting some of the tender Cuttings in any of the *Summer* Months, in Pots fill'd with light sandy Earth, and plac'd in a moderate Hot-bed to facilitate their taking Root, and after they are rooted, they may be expos'd to the open Air until *October* ; when they must be remov'd into a Green-house, placing them in a Situation where they may have as much free Air as possible in mild Weather : During the Winter-Season, they should have frequent, but gentle Refreshings with Water : You must also observe to keep them clear from decay'd Leaves and Branches, which will infect the whole Plants upon which they are suffer'd to remain ; and in the Summer-season they should be expos'd in some well-shelter'd Place amongst other Exotick Plants.

LINARIA ; [so call'd of *Linum*, Lat. *Flax*, because its Leaves resemble *Flax*.] Toad-Flax.

The Characters are ;

The Leaves are oblong, and produc'd alternately on the Branches ; the Cup of the Flower consists of one Leaf, which is divided into five long acute Segments ; the Flower, which consists of one Leaf, is of an anomalous, personated Figure, ending in a Tail behind, and in the Fore-part divided into two Lips, of which the Upper is cut into two or more Parts, and the Under into three ; the Ovary, (which rises from the Center of the Flower-cup) becomes a roundish Fruit or Husk, divided into two Cells or Apartments, by an intermediate Partition, and full of Seeds, which are sometimes flat and border'd, sometimes corner'd and roundish, adhering to the Placenta.

The Species are ;

1. **LINARIA** ; *vulgaris, lutea, flore majore*. C. B. P. Common Yellow Toad-Flax, with a large Flower.

2. **LINARIA** ; *purpurea, major, odorata*. C. B. P. Great Purple, Sweet-smelling Toad-Flax.

3. **LINARIA** ; *latifolia, Dalmatica, magno flore*. C. B. P. Broad-leav'd Dalmatian Toad-Flax, with a large Flower.

4. **LINARIA** ; *latissimo folio, Lusitanica*. Tourne. Broad-leav'd Portugal Toad-Flax.

5. **LINARIA** ; *Hispanica, procumbens, foliis glaucis, flore luteo striato, labiis nigro-purpureis*. Spanish trailing Toad-Flax, with Sea-green

Leaves, and yellow strip'd Flowers with purple Lips.

6. **LINARIA** ; *Sicula multicaulis, folio mol-luginis*. Bocc. Rar. Sicilian Toad-Flax, with many Stalks, and a Leaf of the White Lady's Bed-straw.

7. **LINARIA** ; *triphylla, minor lutea*. C. B. P. Small three-leav'd yellow Toad-Flax.

8. **LINARIA** ; *triphylla, minor lutea, floris vexillo, & calcari purpureo*. Boerb. Ind. Small, three-leav'd, yellow Toad-Flax, with the Standard and Heel of a purple Colour.

The first of these Plants grows in great Plenty upon the Sides of dry Banks in most Parts of *England*, and is seldom cultivated in Gardens, for it is a very troublesome Plant to keep within Bounds, the Roots being very apt to spread under-ground, and rise at a great Distance from the Mother Plant, whereby it greatly injures whatever Plants stand near it. This is the *Species* mention'd in the Catalogue of Simples at the End of the College Dispensatory to be us'd in Medicine.

The second is a perennial Plant, which is often cultivated in Gardens : This produces fine Spikes of purple Flowers in *June* and *July*, and it being a very hardy Plant, growing in almost any Soil or Situation, should be admitted into every good Garden, where it may be planted in shady Situations, or upon the Middle of large Borders in the Pleasure-Garden ; in which Place it will make an handsome Appearance, and continues a long time in Flower.

This Plant is propagated by sowing the Seeds in the *Spring*, which will come up soon after ; and the Plants must be transplanted out into Beds at the Distance of six or eight Inches ; in which Beds they may remain until the *Michaelmas* following, (observing to keep them clear from Weeds) : At which time they should be transplanted into the Places where they are to remain for good, and will require no other Culture than only to keep them clear from Weeds ; and when the Flower-stems advance in the *Spring*, they should be supported by Stakes, otherwise they are subject to be broken by strong Winds : They may also be propagated by parting their Roots in *Autumn* ; but as the Seed ripens very well, so it is the better Way to raise them from that.

The third and fourth Sorts are tenderer than the last, and should be planted in a dry Soil and a warm Situation, otherwise they are often destroy'd in Winter. These are propagated by Seeds in the same manner as the former, as also by parting their Roots ; but it is advisable always to keep some of these Plants in Pots, that they may be remov'd into Shelter in the Winter, otherwise in hard Frosts they will be kill'd.

The fourth is the most beautiful Sort of them all ; this produces very large Spikes of purple Flowers, which make a fine Appearance ; but it seldom produces ripe Seeds in this Country, so that the Seeds must be obtain'd from Abroad, and the Plants propagated from Off-sets or Cuttings ; which, if planted in the *Spring*, will take Root very well, whereby it may be maintain'd.

The

The fifth Sort was brought over from *Gibraltar* by Sir *Charles Wager* Anno 1727, and hath since been communicated to several curious Persons : This Plant is easily propagated by parting the Roots, or planting Cuttings in any of the *Summer* Months, which if water'd and shaded will soon take Root, and may afterwards be planted in Pots fill'd with fresh, light, undung'd Earth, in which they will succeed much better than in a richer Soil ; for if they are planted in a fine rich Earth, it causes them to grow very fast for a short Time, but they seldom fail to rot soon after. These must be remov'd into Shelter in Winter, where they must have as much free Air as possible in mild Weather, and be only protected from severe Cold ; so that if the Pots are plac'd under an Hot-bed Frame, it will be better than to place them in a Green-house ; and I believe if some of the Plants were planted in a dry, rubbishy Soil under a warm Wall, they would endure abroad very well in our ordinary Winters.

The sixth, seventh, and eighth Sorts are annual Plants, which should be sown early in the *Spring* upon a Bed of light, fresh Earth ; and when the Plants are come up about two Inches high, they should be transplanted into the Borders of the Flower-Garden, where they are to remain : These produce their Flowers in *June* and *July*, and their Seeds are ripe in *September*. The Seeds of these Plants may also be sown in *Autumn*, soon after they are ripe, under a warm Wall or Hedge, where they will endure the Cold of our ordinary Winters very well ; and in the *Spring* they may be transplanted out into the Borders, where they are design'd to flower : And these autumnal Plants will grow much larger, and come to flower much sooner than those rais'd in the *Spring*, and from these you will always have good Seeds.

LINGUA CERVINA ; Hart's-Tongue.

These Plants do commonly grow out from the Joints of old Walls and Buildings, where they are moist and shady, but are seldom cultivated in Gardens : There is a very great Variety of these Plants both in the *East* and *West-Indies*, but there are very few of them in *Europe* : They may be propagated by parting their Roots, and should have a moist Soil, and shady Situation.

LINUM ; Flax.

The Characters are ;

The Leaves, for the most part, grow alternately on the Branches ; the Cup of the Flower consists of one Leaf, is tubulous, and divided into five Parts at the Top ; the Flower consists of five Leaves, which expand in Form of a *Clove-July-flower* ; the Ovary, which rises from the Center of the Flower-Cup, becomes an almost globular Fruit, which is generally pointed, and compos'd of many Cells, in which are lodg'd many plain, smooth Seeds, which are blunt at one End, and generally sharp at the other.

The Species are ;

1. LINUM ; *sativum*. C. B. P. Manur'd Flax.

2. LINUM ; *sativum, latifolium, Africanum, fructu majore*. Tourn. Broad-leav'd African manur'd Flax, with a large Fruit.

3. LINUM ; *maritimum, luteum*. C. B. P. Yellow Maritime Flax.

4. LINUM ; *sativum, humilius, flore majore*. Bobart. Dwarf manur'd Flax, with a larger Flower.

5. LINUM ; *perenne majus, caeruleum, capitulo majore*. Mor. Hist. Greater perennial blue Flax, with a large Head.

6. LINUM ; *perenne, majus caeruleum, capitulo minore*. Mor. Hist. Greater perennial blue Flax, with a smaller Head.

There are several Sorts of this Plant which are preserv'd in some curious Gardens of Plants for Variety Sake ; but as they are of little Use or Beauty, so it would be needless to mention them in this Place.

The first Sort is that which is cultivated for Use in divers Parts of *Europe*, and is reckon'd an excellent Commodity ; the right Tilling and Ordering of which is esteem'd a good Piece of Husbandry.

This should be cultivated upon a rich Soil, that has not been plough'd for several Years, upon which Flax always makes the best Improvement ; but as it draws greatly from the Soil, so it should not be sown two Years together upon the same Ground.

The Land must be well plough'd, laid flat and even, upon which the Seeds should be sown about the Middle of *March*, when the Weather is mild and warm : During the *Spring* you must carefully weed it ; which if neglected, (especially in a moist Season) the Weeds will overgrow and destroy the Crop. There are some People who recommend the feeding of Sheep with *Flax*, when 'tis a good Height, and say, they will eat away the Weeds and Grass, and do the *Flax* good ; and if they should lie in it, and beat it down, or flatten it, it will rise again the next Rain : But this must not be practis'd but in a moist Season, and upon a rich Soil, for if the Ground be poor, or the *Spring* dry, it will not rise again to any considerable Height.

The best Seed is that which comes from the *East* Country, and is known by the Name of *Riga Flax* ; for if the *English* Seed be sown three or four times, it is very apt to degenerate : if the Seed be good, two Bushels will be enough to sow an Acre ; but if it be but middling, there should be a greater Allowance : Toward the latter End of *July* the *Flax* will begin to ripen ; when you must be careful that it grow not over ripe, therefore you must pull it up as soon as the Heads begin to change brown and hang downwards, otherwise the Seeds will soon scatter and be lost ; so that the Pluckers must be nimble, and tie it up in Handfuls, setting them upright till they be perfectly dry, and then house them : If the *Flax* be pull'd when it first begins to flower, it will be whiter and stronger than if it stand till the Seed is ripe, but then the Seed will be lost.

The Method of Watering, Piling, Braking, &c. being a particular Business, and foreign to my

my Design, I shall not pretend to give any Directions about it in this Place.

All the other Sorts of *Flax* may be cultivated (by such who have a Curiosity) by sowing their Seeds upon a Bed of fresh, rich, light Earth, in *March* or the Beginning of *April*; and when the Plants come up, they must be carefully weeded, which is all the Culture they require, and they will produce their Flowers, and perfect their Seeds very well.

LINUM UMBILICATUM; vide *Omphalodes*.

LIQUID AMBER; vide *Syrax*.

LITHOSPERMUM; [of *λίθος* a Stone, and *σπέρμα* Seed, q. d. Stone-seed, because the Seed of this Plant is hard, and is good against the Stone of the Reins and Bladder.] Gromwell, Gromill, or Graymill.

The Characters are;

The Cup of the Flower consists of one Leaf, which is cut almost to the Base into five long narrow Segments; the Flower, which is, for the most part, small, consists of one Leaf, is Funnel-shap'd, and spread open at the Top; the Pointal is encompass'd by four Embryo's, which become so many roundish hard polish'd Seeds.

The Species are;

1. **LITHOSPERMUM**; *majus, erectum*. C. B. P. Greater Upright Gromill.

2. **LITHOSPERMUM**; *perenne, procumbens, flore purpureo-ceruleo majore*. Mor. Hist. Trailing perennial Gromill, with a purple-blue Flower.

There are several other Sorts of this Plant, which are mention'd in Botanick Authors, but as they are rarely cultivated in Gardens, I shall omit taking Notice of them in this Place. The first Sort here mention'd, is that which is order'd for Medicinal Uses: This grows in shady Lanes and uncultivated Places in divers Parts of *England*, and is seldom cultivated in Gardens. The second Sort is found wild in some Parts of *Wales*, but is less common than the former. These may be cultivated by sowing their Seeds soon after they are ripe, in a Bed of fresh Earth, allowing them at least a Foot Distance from each other, observing to keep them clear from Weeds, and they will thrive in almost any Soil or Situation.

LOAM is a common superficial Earth, that is a Mixture of Sand and Clay, commonly of a yellowish Colour, though there is some Loam that is blackish: Some call Loam the most common superficial Earth met with in *England*, without any Regard to the Portion it bears to Sand or Clay.

It is found, by Experience, that Plants of all Sorts will grow in it; and where-ever it is found, it appears to be a more beneficial Soil to Plants than any other. A Clay us'd in Grafting is also call'd *Loam*.

LOBUS ECHINATUS; *Bonduc* or Nicker-Tree.

The Characters are;

The Leaves are equally pinnated; the Flower consists of one Leaf, which is cut into many deep Segments, and is almost of an anomalous Figure; from the Cup arises the Pistillum, which becomes a rough, prickly Pod, in which is contain'd one or two hard roundish Seeds.

The Species are;

1. **LOBUS ECHINATUS**; *fructu flavo, foliis rotundioribus*. H. L. The Yellow Nicker, Tree.

2. **LOBUS ECHINATUS**; *fructu casto, foliis longioribus*. H. L. The Ash-colour'd Nicker, vulgô.

These two Plants are very common in *Jamaica*, *Barbadoes*, and all the *Caribbee Islands*, where they climb upon the Shrubs and Trees which grow near them: The Leaves, Branches, Stems, and every Part of them are greatly beset with Prickles, which renders it very troublesome to pass between them where they grow pretty close.

They are preserv'd in the warmest Stoves, by way of Curiosity, in *England*, but have not as yet produc'd any Flowers with us, that I have seen. The Seeds of this Plant are often brought over from the *West-Indies*, but their Shells or Coverings are so very hard, as not to be easily broken; nor do they ever come up when sown upon a Hot-bed as other Seeds: The only Method by which I have been capable of raising these Plants, is, to put the fresh Seeds into a fresh Hot-bed of Tanner's-Bark, under the Bottom of a Pot, (in which there is a Plant growing) where, from the Heat of the Bark, and the Moisture which will gently pass through the Hole at the Bottom of the Pot, and being by the Bark there detain'd, the Shell of the Fruit will split, and the Seeds germinate in a short time; then they may be taken up, and planted into Pots fill'd with light fresh Earth, and plung'd into the Tanner's-Bark, where they will come on apace, if constantly supply'd with Water: During the Winter-season they must be kept very warm, and often refresh'd with Water; but it must be given them by small Quantities at a time, for if they have too much Moisture given them at that Season, it is very apt to destroy them: In the Summer-time, when the Weather is warm, they will require a greater Share of Air, but they must never be set abroad, even in the hottest Season, for they are too tender to bear the open Air in our Climate, so that they must be constantly preserv'd in the Stoves with *Papaws*, and other free-growing Plants which come from the same Country.

LOCULAMENTS, are little distinct Cells, or Partitions, within the Seed-Vessels of Plants.

LONCHITIS; so call'd of *λόγχη*, a Lance or Spear, because the Leaves are so sharp-pointed as to resemble the Point of a Spear.] Rough Spleenwort.

The Characters are ;

The Leaves are like those of the Fern, but the Pinnulae are ear'd at their Base : The Fruit also is like that of the Fern.

The Species are ;

1. LONCHITIS ; *aspera*. Ger. Rough Spleenwort.

2. LONCHITIS ; *aspera, major*. Ger. Emac. Greater Rough Spleenwort.

The first of these Plants is very common in shady Woods, by the Sides of small Rivulets in divers Parts of England : But the second Sort is not quite so common, and has been brought into several curious Botanick Gardens from the Mountains in Wales. There are also great Variety of these Plants in America, which at present are Strangers in the European Gardens. They are seldom cultivated but in Botanick Gardens, for the sake of Variety, where they must have a moist Soil, and a shady Situation.

LONGITUDINAL VESSELS in Plants, are such as are extended in Length through the woody Parts of Trees and Plants, into which the Air is suppos'd to enter and mix with the Juices of the Plant and thereby augment its Bulk.

LOPPING: It is very observable, that most old Trees are hollow within; which does not proceed from the Nature of the Trees, but is the Fault of Those who have the Management of them, who suffer the Tops to grow large before they lop them, as the *Ash*, *Elm*, *Horn-beam*, &c. and persuade themselves that they may have the more great Wood; but, in the mean time, don't consider that the cutting off great Tops do endanger the Life of a Tree, or, at best, wound it so that many Trees decay more yearly in their Bodies, than the yearly Tops come to; and at the same Time that they furnish themselves with more great Wood, they do it at the Loss of the Owner. And, indeed, though the *Horn-beam* and *Elm* will bear great Tops when the Body is little more than a Shell, yet the *Ash*, if it comes to take Wet at the Head, very rarely bears more Top after the Body of the Tree decays: Therefore, if once these Trees decay much in the Middle, they will be worth little but for the Fire; so that if you find a Timber Tree decay, it should be cut down in Time, that the Timber be not lost.

The Lopping of young Trees, that is, at ten or twelve Years old at most, will preserve them much longer, and will occasion the Shoots to grow more into Wood in one Year, than they do in old Tops at two or three. Great Boughs ill taken off, often spoils many a Tree; for which Reason they should always be taken off close and smooth, and not parallel to the Horizon; and cover the Wound with Loam and Horse-dung mix'd, to prevent the Wet from entering the Body of the Tree.

When Trees are at their full Growth, there are several Signs of their Decay; as, the

withering or dying of many of their top Branches; or if the Wet enters at any Knot; or they are anywise hollow, or discolour'd; if they make but poor Shoots; or if Wood-Peckers make any Holes in them.

All Sorts of Resinous Trees, or such as abound with a Milky Juice, should be lop'd very sparingly; for they are subject to decay when often cut. The best Season for Lopping these Trees is soon after *Bartholomew-tide*, at which Time they seldom bleed much, and the Wound is commonly heal'd over before the cold Weather comes on.

LOTUS: Birds-foot Trefoil.

The Characters are ;

It hath a papilionaceous Flower; the Ovary which rises out of the Flower-cup, afterwards becomes a Pod, sometimes distinguish'd as it were into Cells, by transverse Partitions, which are full of Seeds, for the most part roundish; to which may be added, the Leaves grow by Trees, but have two Wings or little Leaves at the Origin of their Foot-stalks.

The Species are ;

1. LOTUS ; *villosus, altissimus, flore glomerato*. Tourn. The tallest hairy Birds-foot Trefoil, with a glomerated Flower.

2. LOTUS ; *pentaphyllus, filiquosus, villosus*. C. B. P. Upright hoary Birds-foot Trefoil.

3. LOTUS ; *variegatus, frutescens, Cretica, argentea, filiquis longissimis propendentibus rectis*. Mor. Hist. Shrubby Silver Birds-foot Trefoil of Crete, with long strait hanging Pods.

4. LOTUS ; *hemorrhoidalis, humilior & candidior*. Tourn. Lower and whiter Hemorrhoidale Birds-foot Trefoil.

5. LOTUS ; *angustifolius, flore luteo purpureo, ex insula sancti Jacobi*. Hort. Amst. Narrow-leav'd Birds-foot Trefoil from the Island of St. James, with a purple yellow Flower.

6. LOTUS ; *ruber, filiqua angulosa*. C. B. P. Red square-codded Birds-foot Trefoil, commonly call'd Winged Peas.

7. LOTUS ; *ruber, filiqua angulosa, folio variegato*. Boerb. Ind. Red square-codded Birds-foot Trefoil, with a variegated Leaf.

8. LOTUS ; *filiquis ornithopodii*. C. B. P. Birds-foot Trefoil, with Pods like a Birds-foot.

The first of these Plants is by some supposed to be the *Cytisus* of Virgil; but with how much Justness I will not pretend to determine, since it is very difficult to ascertain many of his Plants; for the greatest Part of them are only translated from Theocritus's Greek into Latin, so that it may justly be supposed that Virgil himself did not know the Plants of which he wrote; and whoever has a Curiosity to know what the Plants there mention'd are, should diligently search for them in Sicily where Theocritus lived, and it is very probable many of them are still to be found.

This Plant dies to the Ground with us every Winter, and rises again the succeeding Spring, and when the Roots are strong, the Shoots will

will be four or five Feet high, and produce in great Plenty: If it be cut while young, the *Cows* are very fond of it; but *Horses* will not eat it unless they are very hungry. The Roots when strong, will admit of the Shoots being cut three or four times in a *Summer*, for they put out again soon after they are cut, and grow very strong in a short time; but this Plant does not come up before *April* in our Country, and commonly dies down in *October*, so that if it were the best Fodder for Cattle, it could only be obtained in *Summer*, for I am afraid it will hardly be of any use when dried.

It may be propagated from the Seeds, which are generally produced in great Plenty, and must be sown very thin in Rows, at about eighteen Inches asunder, the Beginning of *April*; and in *May*, when the Plants will be come up, the Ground should be hoe'd between the Rows, in order to destroy the Weeds, and the Plants cut up, where they are too thick (for they should be eight or ten Inches apart in the Rows at least) for though they will appear but weak at their first coming up, yet when their Roots have taken fast hold of the Ground, they will increase their Strength greatly, for I have had a single Root of this Plant which has been a Foot diameter over the Crown, and hath produced above a Hundred Shoots at one time.

You must also continuing hoeing the Ground from time to time as the Weeds are produced, which if permitted to over-grow the Plants while they are young, will certainly destroy them; so that the first Season they must be managed with great Care, but afterwards when the Plants have obtain'd more Strength, they will be capable of encountering the Weeds; though then the Ground between the Rows should be stirr'd with a Breast-plough after the Crop is cut down, which will greatly promote its Growth.

This Plant delights in a dry, barren, gravelly Soil, on which it will resist the severest Cold of our Climate, and abide many Years.

It may also be propagated by planting Cuttings or Slips taken from the old Plants in *July*, when they have acquired a Hardness, which should be planted in a moist, cloudy Season, or water'd and shaded, and in a short time they will take Root; but as this is difficult to perform when a Quantity is design'd, so the better way is to propagate it by Seeds.

The second, third, fourth and fifth Sorts are preserved in Gardens as Curiosities; these are impatient of much cold, and must therefore be planted in Pots, and hous'd in Winter, otherwise they are often destroy'd in our Country, especially the fifth, which is much the tenderest Plant of all the Sorts: These may be all propagated by sowing their Seeds upon a moderate Hot-bed in the *Spring*, and when the Plants are come up, they must be transplanted either upon another moderate Hot-bed, or into Pots, and plung'd into a Hot-bed, to promote their taking Root, after which in *May* they should be removed into the open

Air, where they must be placed in some well-shelter'd Situation, amongst other exotick Plants, in which Place they may remain until the Middle or End of *October* following, when they must be removed into the Green-house, observing to place them where they may have as much free Air as possible in mild Weather, for if they are kept too closely shut up, or stand under the Branches of other Trees or Plants, they are very apt to draw very weak, and decay soon after; they must also be often refresh'd with Water, but it should not be given them in Winter in too great Quantities, for that will rot their Roots, especially of the fifth Sort, which, as I before said, is the tenderest: In the *Spring* they should be inured very early to the open Air, into which they should always be remov'd at the Beginning of *May*, or earlier, according as the Season proves favourable.

These may also be propagated by planting Cuttings, in any of the Summer Months, into a Bed of light Earth, observing to water and shade them until they have taken Root; after which they may be planted into Pots fill'd with light fresh Earth, and must be managed as was directed for the Seedling Plants. They all produce their Flowers in *June*, *July*, and *August*, and most of them ripen their Seeds very well in *England*: But the fifth Sort, which is the most rare, and produces the handsomest Flowers, seldom perfects Seeds with us, so that it must be always propagated from Cuttings; and in Winter must be placed somewhat warmer than the other Sorts, tho' not too near other Plants; and should be every Year renew'd from Cuttings; for the old Plants are very subject to decay in Winter. The sixth Sort is an annual Plant, which, by many People, is sown here and there, upon the Borders of the Flower-Garden, with other small Annuals, amongst which it makes a pretty Variety.

The Flowers of this Plant (which are in Form of a *Pea-blossom*) are of a deep-red Colour, and are succeeded by Pods with four Angles or Wings (which occasion'd their being call'd *Wing'd Peas*) containing several hard round Seeds.

It is easily propagated by sowing the Seeds in *March* or *April* upon the Borders where they are to remain; for they do not thrive so well when transplanted: And they will require no farther Care than only to keep them clear from Weeds. In *June* they will begin to flower, and continue 'till *August*, when their Seeds will ripen soon after.

The seventh Sort is only a Variety of the sixth, from which it differs in having a variegated Leaf; this Difference it commonly retains from Seeds, which is what few other Plants will do. This may be propagated as the former.

The eighth Sort is only preserv'd in some Gardens, more for the Oddness of its Pods, (which very much resemble a Bird's Foot) than for any particular Beauty of the Plant: But in a large Garden it may be admitted, for the

the sake of Variety. This may be propagated in the same manner as the two former, and is also annual, as they are.

LOTUS ARBOR ; *vide* Celtis.

LOVE APPLE ; *vide* Lycopersicon.

LUNARIA, [so call'd, of *Luna*, Lat. the Moon, because the Seed-vessels resemble the Form of the Moon.] Moon-wort, Satten-Flower, or Honesty.

The Characters are ;

The Flower consists of four Leaves, which expand in Form of a Cross : The Ovary (which rises in the Centre of the Flower) becomes a compress'd perfectly smooth Fruit, divided, as it were, into two Cells by an intermediate Partition, to which adhere the parallel and membranous Valves, and fill'd with Seeds, which have commonly a broad Border, and are shap'd like a Kidney.

The Species are ;

1. LUNARIA ; *major, siliqua rotundiore.* J. B. Greater Moon-wort, with round Pods, commonly call'd Honesty, or White Satten.

2. LUNARIA ; *major, siliqua longiore.* J. B. Greater Moon-wort, with a longer Pod.

3. LUNARIA ; *major, perennis, siliqua rotundiori, flore albo.* Tourn. Greater perennial Moon-wort, with a rounder Pod, and a white Flower.

4. LUNARIA ; *Leucoji folio, siliqua oblonga majori.* Tourn. Moon-wort, with a Stock-July-flower Leaf, and a large oblong Pod.

5. LUNARIA ; *fruticosa perennis, incana, Leucoji folio.* Tourn. Shrubby perennial Moon-wort, with a Stock-July-flower Leaf.

6. LUNARIA ; *Orientalis, Leucoji folio incano, lutea patula.* Jussieu. Yellow spreading Eastern Moon-wort, with a Stock-July-flower Leaf.

7. LUNARIA ; *perennis lutea, folio Leucoji, ramis expansis.* Vail. Branching yellow perennial Moon-wort, with a Stock-July-flower Leaf.

There are some other Varieties of this Plant, which are preserv'd in curious Botanick Gardens : But those here mention'd are the best worth cultivating, for their Beauty.

The first of these Plants is very common in most old Gardens in England, and is commonly known by the Name of Honesty, or White Satten : It requires very little Culture, and should be sown soon after the Seeds are ripe in Autumn, upon a Bed or Border of common Earth, in almost any Situation, (provided it be not under the Dripping of Trees) in which Place they should be suffer'd to remain; for they seldom thrive well if transplanted ; and in May following they will produce Flowers, and the Seeds will ripen in August. The Seed-vessels of this Plant, when they are full ripe, become very transparent, and of the Appearance of White Satten, at which Time the Branches are cut off and dry'd ; after which, they are preserv'd to place in the Chimnies of Halls and large Rooms, where they appear very agreeable.

The other Sorts may be all propagated in the same manner as the former, with this Difference, *viz.* That as they are somewhat tenderer, so they should have a warmer Situation, otherwise they are subject to be destroy'd in very cold Winters : They should also have a dry Soil, which should be fresh, but not dung'd ; for if the Soil be too rank, they often canker and decay, especially in wet Seasons.

These Plants are all of them pretty Varieties in large Gardens where there is Room : But they are seldom cultivated in small Places, especially the two first Sorts, which grow pretty large, and take up too much Room. Their Flowers are not very beautiful : But for the Oddness of their Seed-vessels, as also the different Appearances of the Plants, they may be admitted.

The third, fifth, and sixth Sorts are perennial Plants, which may be propagated by planting Cuttings of any of them in the Summer Months, in a shady Border of light fresh Earth, observing to water them until they have taken Root ; after which, they may be remov'd into the Places where they are to remain, and must be treated as those Plants which were rais'd from Seeds.

LUPINUS: Lupine.

The Characters are ;

It hath a papilionaceous Flower, out of whose Empalement rises the Pointal, which afterwards turns into a Pod, that is fill'd with either plain or spherical Seeds. To which may be added, the Leaves grow like Fingers upon the Footstalks.

The Species are ;

1. LUPINUS ; *sylvestris, purpureo flore, semine rotundo vario.* J. B. Wild Lupine, with a purple Flower, and round variegated Seed, commonly call'd The Lesser Blue Lupine.

2. LUPINUS ; *angustifolius, caeruleus elatior.* Raii Hist. Narrow-leav'd Taller Blue Lupine.

3. LUPINUS ; *sylvestris, flore luteo.* C. B. P. The common Yellow Lupine.

4. LUPINUS ; *peregrinus, major, vel villosus caeruleus major.* C. B. P. Foreign Greater Hairy Lupine, with a large blue Flower, commonly call'd The Great Blue Lupine.

5. LUPINUS ; *peregrinus, major, flore incarnato.* H. L. Foreign Greater Lupine, with a Flesh-colour'd Flower, commonly call'd The Rose Lupine.

6. LUPINUS ; *sativus, flore albo.* C. B. P. Garden or Manured Lupine, with a white Flower.

7. LUPINUS ; *caeruleus, minor, perennis, Virginianus, repens.* Mor. Hist. Smaller Perennial Creeping Blue Lupine of Virginia.

There are several other Varieties of this Plant, which are preserv'd in some curious Botanick Gardens, that differ chiefly in the Colour and Size of their Flowers and Fruit ; but those here mention'd are such as generally are preferr'd, for the Beauty of their Flowers, for which alone they are propagated in the English Gardens.

The

The first Sort is very common in every Garden, being sown in the Borders of the Flower-Garden, with other hardy Kinds of annual Plants, which do not require the Assistance of a Hot-bed to bring them forward. The Seeds of this, and the common *Yellow* and *White Lupines*, are very common at every Seed-shop, where they are generally sold at a very reasonable Price. These Seeds may be sown in *April*, *May*, and *June*, in order to continue a Succession of their Flowers through the *Summer*. They must be sown where they are to remain, for they seldom do well if transplanted: They love a light Soil, not too rich or moist; in both which they are very subject to rot before they perfect their Seeds.

These produce their Flowers successively in *June*, *July*, and *August*, according to the Time of their being sown, and do commonly grow about two Feet high; so that if they are rightly dispos'd amongst other annual Plants of the same Growth in Borders, they make an agreeable Variety. The Seeds of these Plants should always be sown in dry Weather, for if there should happen to be much Wet soon after they are put into the Ground, it commonly rots them. The blue and white Sorts have no Scent, but the yellow has a very agreeable Odour, for which it is commonly preferr'd by most People to the others.

The narrow-leav'd, tall, blue *Lupine* is not so common in *England* as the other Sorts, tho' in *Italy* and *Spain* it is one of the most common: In the former of which Places it is sown to improve the Ground which is design'd for Vineyards; where, when the *Lupines* are in Flower, they cut them down, and plough'em into the Ground as Manure: Or, if they have not Time enough to do this, they parboil the Seeds to prevent their growing, and sow them upon the Ground (allowing sixteen Bushels to an Acre) and plough them in; so that in these Countries it is a valuable Plant.

The fourth and fifth Sorts are still more rare than any of the former, and only to be found in some curious Gardens, (especially the fourth, which was formerly very common, but is now almost lost amongst us:) These Plants do grow three Feet high, and spread out into many Branches, which are furnish'd with fine Spikes of large Flowers, which make a handsome Appearance, and continue a long Time in Beauty. The Seeds of these Plants should be sown very early in the *Spring*, upon a warm dry Border, where they must remain to flower, for if they are sown late they seldom perfect their Seeds with us; therefore the better Way is to sow them in *August*, under a warm Wall or Hedge, where the Plants will come up, and endure the Cold of our ordinary Winters very well: And these Plants will flower earlier the succeeding *Summer*, and never fail to produce ripe Seeds; whereas those sown in the *Spring* do very often miscarry.

The seventh Sort is an abiding Plant, which grows in great Plenty in *America*; from whence the Seeds have been brought into *England*, where it thrives very well, provided it be suffer'd to remain in the Place where it

was sown, for the Roots of this Plant commonly run very deep into the Ground, which by removing are commonly broken, after which the Plant seldom does well. This should be sown on a light dry Soil, in which it will thrive very well, and continue several Years, producing fine Spikes of blue Flowers; but this Sort rarely perfects its Seeds in this Country.

LUPULUS: [This Plant takes its Name of *Lupus*, Lat. a *Wolf*, because the Antients had a Notion, that *Wolves* were wont to hide themselves under this Plant.] The Hop.

The Characters are;

It hath a creeping Root; the Leaves are rough, angular, and conjugated; the Stalks do climb and twist about whatever is near them; the Flowers are Male and Female on different Plants; the Male Flowers consist of a Calix divided into five Parts, which surrounds the Stamina, but has no Petals to the Flower; the Female Plants have their Flowers collected into squamose Heads, which grow in Bunches; from each of the leafy Scales is produc'd an horned Ovary, which becomes a single roundish Seed.

The Species are;

1. **LUPULUS**, mas. C. B. P. The Male Hop, commonly call'd, The Wild Hop.
2. **LUPULUS**, fœmina. C. B. P. The Female or manur'd Hop.

Of this last Sort, the People who cultivate them, reckon three different Varieties; as first, The long and square *Garlick Hop*, the long *White Hop*, and the *Oval Hop*; all which are indifferently cultivated in *England*: But of the Male Hop, there has been no Notice taken of any different Varieties. This Sort grows wild in Hedges in divers Parts of *England*, but is never cultivated, as being of no Use.

There being the greatest Plantation of Hops in *Kent* that are in any County in *England*, it is very probable that their Method of planting and ordering them should be the best.

As for the Choice of their Hop-Grounds, they esteem the richest and strongest Grounds as the most proper; they chuse a warm dry Soil, that has a good Depth of hazel Mould, and if it be rocky within two or three Feet of the Surface, the Hops will prosper well, but they will by no means thrive on a stiff Clay, or spongy wet Land.

If it may be, chuse a Piece of Meadow or Lay-ground to plant Hops on, such as has not been till'd or sown for many Years, or an old decay'd Orchard; for Land that is worn out by long bearing of Corn will require abundance of Dung to bring it into any tolerable Condition to bear a Crop of Hops.

They accounting new Land best for Hops, the *Kentish* Planters plant their Hop-Gardens with *Apple-trees* at a large Distance, and with *Cherry-trees* between; so that when the Land hath done its best for Hops, which they reckon it will in about ten Years, the Trees may begin to bear: The *Cherry-trees* last about thirty Years; and by that time the *Apple-trees* are large, they cut down the *Cherry-trees*.

The *Essex* Planters account a moory Land the properest for *Hops*, tho' there are several other Sorts of Soil that are esteem'd very good.

Some account that Land that has a roffelly Top, and a brick-earthy Bottom the best: A true Roffel or light Land is what they generally plant in, whether it be white or black.

Moory Land is of different Sorts; some being fix'd and heavy, so as to crack in Summer; and some so light, that in dry Seasons it will blow away with the Wind; and some are of a middle Consistence, being compos'd of both.

These Moors, for Goodness and Value, are according to the Nature and Goodness of the Soil that is underneath them; which being flung up upon the Surface, will make a very good Mixture, it being best to fling the under Soil downward for *Hops*, because they naturally root downwards, sometimes four or five Yards deep, and therefore the deepest and richest Soil is best for them.

Few are acquainted with the Value of Moors, because they do not search into the Bottom of them, by reason of the Expensiveness of doing it, and the Difficulty of carrying off the Water.

If the Land be moist, it ought to be laid up in high Ridges, and to be well drain'd, and the Drain kept clear and open, especially in Winter, that the Water do not rot, or too much chill the Roots.

If the Land be sour, or cold, it will be very much help'd by burning it; and if the Haulm and Strings of the *Hops* be burnt every Year, and some of the Paring or Sides of the Garden or other Earth be laid on them as they burn, and then more Haulm be laid over that, and so continu'd Layer upon Layer, it will make an excellent Compost to make the Hills with.

As to the Situation of a *Hop-Ground*, one that inclines to the South or West is the most eligible; but if it be expos'd to the North-East or South-West Winds, there should be a Shelter of some tall Trees at a Distance, because the North-East are apt to nip the tender Shoots in the *Spring*, and the South-West frequently break and blow the Poles at the latter End of the *Summer*, and very much endanger the *Hops*.

Hops require to be planted in an open Situation, that the Air may freely pass round and between them, to dry up and dissipate the Moisture, whereby they would not be so subject to Fire-blasts, which often destroy the Middles of large Plantations, while the Outfides remain unhurt.

As for the Preparation of the Ground for Planting, it should, the Winter before, be plough'd and harrow'd even; and then lay upon it in Heaps a good Quantity of fresh rich Earth, or well-rotted Dung and Earth mix'd together, sufficient to put half a Bushel in every Hole to plant the *Hops* in, unless the natural Ground be very fresh.

Then lay a Line across it, from the Hedge, in which Knots have been ty'd, at the Distance

you design your *Hop-hills* to be at, about eight or nine Feet Distance the whole Length of the Ground, and place a sharp pointed Stick at every Knot; then lay aside the Line, and with two forked Sticks of about eight or nine Feet long, you may from that first Row set out the whole Ground, by applying the two Forks to two of the Sticks which were first set up, and placing another Row at the Ends where the forked Sticks meet triangularwise: Then you should dig a Hole at every Stick about a Foot and an half wide, and fill it full of the good Earth you brought in.

If you plough the Ground with Horses between the Hills, it will be best to plant them in Squares Checquerwise, but the *Quincunx* Form is the most beautiful, and it will also be better for the *Hop*: But if the Ground be small, that it may be done with the Breast-Plough or Spade, it will do very well; but which Way soever you make use of, a Stake should be stuck down at all the Places where the Hills are to be made.

Persons ought to be very curious in the Choice of the Plants and Sets as to the Kind of *Hop*; for if the *Hop-Garden* be planted with a Mixture of several Sorts of *Hops*, that ripen at several Times, it will cause a great deal of Trouble, and be a great Detriment to the Owner.

The two best Sorts are the white and the grey Bind; the latter is a large square *Hop*, more hardy, and is the more plentiful Bearer, and ripens later than the former.

There is also another Sort of the white Bind, which ripens a Week or ten Days before the common; but this is tenderer, and a less plentiful Bearer: But it has this Advantage, it comes first to Market.

But if three Grounds, or if three distant Parts of one Ground be planted with these three Sorts, there will be this Conveniency, that they may be pick'd successively as they become ripe.

The Sets ought to be procur'd out of Grounds that are intirely of the same Sort you would have; they should be five or six Inches long, with three or more Joints or Buds on them, all the old Bind and hollow Part of the Set being cut off.

If there be a Sort of *Hop* you value, and would increase Plants and Sets from, the superfluous Binds may be laid down when the *Hops* are ty'd, cutting off the Tops, and burying them in the Hill; or when the *Hops* are dress'd, all the Cuttings may be sav'd, and laid in Rows in a Bed of good Earth, for almost every Part will grow, and become a good Set the next *Spring*.

Some have try'd to raise a *Hop-Ground* by sowing Seeds; but that turns to no Account, because that Way is not only tedious, but the *Hops* so produc'd are commonly of different Kinds, and many of them wild and barren.

As to the Seasons of planting *Hops*, the *Kentish* Planters best approve the Months of *October* and *March*, both which succeed very well; but the common Sets are not be had in *October*, unless from some Ground that is

to be digged up and destroy'd; and likewise there is some Danger, that the Sets may be rotted if the *Winter* prove very wet: But the most usual Time of procuring them is in *March* when the *Hops* are cut and dressed.

As to the Manner of planting the Sets, you should put five good Sets in every Hole with a Setting-stick; one is to be plac'd in the Middle, and the rest round about, sloping, the Tops meeting at the Center: They must stand even with the Surface of the Ground; let them be press'd close with the Hand, and cover'd with fine Earth, and a Stick should be plac'd on each Side the Hill to secure it.

The Ground being thus planted, all that is to be done more that *Summer*, is to keep the Hills clear from Weeds, and to dig up the Ground about the Month of *May*, and to gather up the Stones, if more are turn'd up by digging, to raise a small Hill round about the Plants: And in *June*, you must twist the young Binds or Branches together into a Bunch or Knot, for if they are ty'd up to small Poles the first Year, in order to have a few *Hops* from them, it will not countervail the weakning of the Plants.

A Mixture of Compost or Dung being prepar'd for your *Hop-Ground*, the best Time for laying it on, if the Weather prove dry, is about *Michalmas*, that the Wheels of the Dung-Cart may not injure the *Hops*, nor furrow the Ground: If this be not done then, you must be oblig'd to wait till the Frost has harden'd the Ground, so that it will bear the Dung-Cart: And this is also the Time to carry on your new Poles, to recruit those that are decay'd, and to be cast out every Year.

If you have good Store of Dung, the best Way will be to spread it in the Alleys, all over the Ground, and to dig it in the *Winter* following: The Quantity they will require, will be forty Loads to an Acre, reckoning about thirty Bushels to the Load.

If you have not Dung enough to cover all the Ground in one Year, you may lay it on one Part one Year, and on the rest in another, or a third, for there is no Occasion to dung the Ground after this manner oftener than once in three Years.

Those who have but a small Quantity of Dung, usually content themselves with laying on about twenty Loads upon an Acre every Year; this they lay only on the Hills, either about *November*, or in the *Spring*, which last some account the best Time, when the *Hops* are dress'd, to cover them after they are cut; but if it be done at this Time, the Compost or Dung ought to be very well rotted and fine.

As to the dressing of the *Hops*: When the *Hop-Ground* is dug in *January* or *February*, the Earth about the Hills, and very near them, ought to be taken away with a Spade, that you may come the more conveniently at the Stock to cut it.

About the End of *February*, if the *Hops* were planted the *Spring* before, or if the Ground be weak, they ought to be dress'd in dry Weather; but else, if the Ground be strong, and in Perfection, the Middle of

March will be a good Time; and the latter End of *March*, if it be apt to produce over-rank Binds, or the Beginning of *April* may be soon enough.

Then having, with an Iron Picker, clear'd away all the Earth out of the Hills, so as to make the Stock bare to the principal Roots, with a sharp Knife you must cut off all the Shoots which grew up with the Binds the last Year; and also all the young Suckers, that none be left to run in the Alley, and weaken the Hill. It will be proper to cut one Part of the Stock lower than the other, and also to cut that Part low that was left highest the preceding Year: By pursuing this Method, you may expect to have stronger Binds, and also keep the Hill in good Order.

In dressing those *Hops* that have been planted the Year before, you ought to cut off both the dead Tops and the young Suckers which have sprung up from the Sets, and also to cover the Stocks with a Hive with fine Earth a Finger's Length in thickness.

About the Middle of *April* the *Hops* are to be pol'd, when the Shoots begin to sprout up; the Poles must be set to the Hills deep into the Ground, with a square Iron Pitcher or Crow, that they may the better endure the Winds; three Poles are sufficient for one Hill: These should be plac'd as near the Hills as may be, with their bending Tops turn'd outwards from the Hill, to prevent the Binds from intangling, and a Space between two Poles ought to be left open to the South to admit the Sunbeams.

The Poles ought to be in Length sixteen or twenty Feet, more or less, according as the Ground is in Strength; and great Care is to be taken not to over-pole a young or weak Ground, for that will draw the Stock too much and weaken it: If a Ground be over-poled, you are not to expect a good Crop from it, for the Branches which bear the *Hops* will grow very little till the Binds have over-reach'd the Poles, which they cannot do when the Poles are too long; two small Poles are sufficient for a Ground that is young.

If you wait till the Sprouts or young Binds are grown to the Length of a Foot, you will be able to make a better Judgment where to place the largest Poles; but if you stay till they are so young as to fall into the Alleys, it will be injurious to them, because they will intangle one with another, and will not clasp about the Pole so readily.

Maple or *Aspen* Poles are accounted the best for *Hops*, on which they are thought to prosper best, because of their Warmth; or else, because the climbing of the *Hop* is furthered by means of the Roughness of the Bark. But for Lastingness, *Aspen* or *Willow* Poles are preferable; but *Chestnut* Poles are the most durable of all.

If after the *Hops* are grown up, you find any of them have been under-poled, taller Poles may be placed near those that are too short to receive the Binds from them.

As to the Tying of *Hops*, the Buds that do not clasp of themselves to the nearest Pole when

when they are grown to three or four Feet high, must be guided to it by the Hand, turning them to the Sun, whose Course they will always follow: They must be bound with withered Rushes, but not so close as to hinder them from climbing up the Pole.

This you must continue to do 'till all the Poles are furnish'd with Binds, of which two or three are enough for a Pole; and all the Sprouts and Binds that you have no occasion for are to be pluck'd up: But if the Ground be young, then none of these useless Binds should be pluck'd up, but should be wrapt up together in the middle of the Hill.

When the Binds are grown beyond the Reach of your Hands, if they forsake the Poles, you should make use of a Stand-Ladder in tying them up.

Some advise, that if the Binds be very strong, and over-grow the Poles very much, to strike off their Heads with a long Switch, to increase their branching below.

Towards the Latter-end of *May*, when you have made an end of tying them, the Ground must have the Summer Digging: This is done, by casting up with the Spade some fine Earth into every Hill; and a Month after this is done, you must pare the Alleys with a Shovel, and make the Hills up to a convenient Bigness.

It is not at all to be doubted but that a thorough Watering would be of very great Advantage to *Hops* in a hot dry Summer: But it is so much Charge and Trouble to do this, that unless you have a Stream at Hand to flow the Ground, it is scarce practicable.

When the *Hops* blow, you should observe if there be any wild barren Hills among them, and mark them, by driving a sharpened Stick into every such Hill, that they may be digg'd up, and replanted.

Hops, as well as other Vegetables, are liable to Distempers and Disasters, and, among the rest, to the Fen.

The Reverend Mr. *Hales*, in his excellent Treatise of *Vegetable Statics*, treating of *Hops*, gives us the following Account of the State of *Hops* in *Kent*, in the Year 1725, that he receiv'd from Mr. *Austin* of *Canterbury*, which is as follows:

In Mid-*April* not half the Shoots appear'd above-ground; so that the Planters knew not how to plant them to the best Advantage.

This Defect of the Shoot, upon opening the Hills, was found to be owing to the Multitude and Variety of Vermin that lay preying upon the Roots; the Increase of which, was imputed to the long and almost uninterrupted Series of dry Weather for three Months before: Towards the End of *April* many of the *Hop-Vines* were infested with Flies.

About the 20th of *May* there was a very unequal Appearance, some Vines being run seven Feet, others not above three or four; some just ty'd to the Poles, and some not visible: And this disproportionate Inequality in their Size continu'd thro' the whole Time of their Growth.

The Flies now appeared upon the Leaves

of the forwardest Vines, but not in such Numbers here, as they did in most other Places. About the Middle of *June* the Flies increas'd, yet not so as to endanger the Crop; but in distant Plantations they were exceedingly multiply'd, so as to swarm towards the End of the Month.

June 27th some Specks of Fen appear'd: From this Day to the 9th of *July* was very dry Weather. At this Time, when it was said that the *Hops* in most Parts of the Kingdom look'd black and sickly, and seem'd past Recovery, ours held it out pretty well, in the Opinion of the most skilful Planters.

The great Leaves were indeed discolour'd, and a little wither'd, and the Fen was somewhat increas'd. From the 9th of *July* to the 23d the Fen increas'd a great deal; but the Flies and Lice decreas'd, it raining much daily. In a Week more, the Fen, which seem'd to be almost at a Stand, was considerably increas'd, especially in those Grounds where it first appeared.

About the Middle of *August* the Vines had done growing both in Stem and Branch; and the forwardest began to be in the Hop, the rest in Bloom: The Fen continued spreading where it was not before perceiv'd; and not only the Leaves, but many of the Burrs were also tainted with it.

About the 20th of *August* some of the *Hops* were infected with the Fen, and whole Branches corrupted by it. Half the Plantations had pretty well escap'd hitherto, and from this Time the Fen increas'd but little: But several Days Wind and Rain in the following Week so distorted them, that many of them began to dwindle, and at last came to nothing; and of those that then remain'd in Bloom, some never turn'd to *Hops*; and of the rest which did, many of them were so small, that they very little exceeded the Bigness of a good thriving Burr.

We did not begin to pick till the 8th of *September*, which is eighteen Days later than we began the Year before: The Crop was little above two-hundred on an Acre round, and not good. The best *Hops* sold this Year at *Way-Hill* for sixteen Pounds the Hundred.

The Reverend Mr. *Hales*, in his afore said Treatise, gives us an Account of the following Experiment that he made on *Hop-Vines*: He tells us, That at *July* he cut off two thriving *Hop-Vines* near the Ground, in a thick, shady Part of the Garden, the Pole still standing; he stript the Leaves off from one of these Vines, and set their Stems in known Quantities of Water in little Bottles; that with Leaves imbib'd in a twelve Hours Day four Ounces, and that without Leaves three-fourths of an Ounce.

He took another *Hop-Pole* with its Vines on it, and carry'd it out of the *Hop-Ground* into a free and open Exposure; these imbib'd and perspir'd as much more as the former in the *Hop-Ground*: Which is, doubtless, the Reason why the *Hop-Vines* on the Out-sides of Gardens, where they are most expos'd to the Air, are short and poor, in comparison of

of those in the Middle of the Ground, *viz.* because being much dry'd, their Fibres harden sooner, and therefore they cannot grow so kindly as those in the Middle of the Ground, which, by Shade, are always kept moister, and more ductile.

The same curious Author proceeds as followeth: Now there being 1000 Hills in an Acre of Hop-Ground, and each Hill having 3 Poles, and each Pole 3 Vines, the Number of Vines will be 9000, each of which perspiring 4 Ounces, the Sum of all the Ounces perspired by an Acre in 12 Hours Day will be 36000 Ounces = 15750000 Grains = 62007 Cube Inches, or 220 Gallons; which divided by 6272640, the Number of square Inches in an Acre, it will be found that the Quantity of Liquor perspir'd by all the Hop-Vines will be equal to an Area of Liquor as broad as an Acre, and $\frac{1}{100}$ Part of an Inch deep, besides what evaporated from the Earth.

And this Quantity of Moisture in a kindly State of the Air, if daily carry'd off, is a sufficient Quantity to keep the Hops in an healthy State: But in a rainy moist State of Air, without a due Mixture of dry Weather, too much Moisture hovers about the Hops, so as to hinder, in some measure, the kindly Perspiration of the Leaves, whereby the stagnating Sap corrupts, and breeds mouldy Fen, which often spoils vast Quantities of flourishing Hop-grounds.

This was the Case in the Year 1723, when for ten or fourteen Days almost continual Rains fell, about the latter half of July, after four Months dry Weather; upon which the most flourishing and promising Hops were all infected with Mould or Fen in their Leaves and Fruit, while the then poor and unpromising Hops escap'd, and produc'd Plenty; because they being small, did not perspire so great a Quantity as others; nor did they confine the perspired Vapour, so much as the large thriving Vines did in their shady Thickets.

This Rain on the then warm Earth made the Grass shoot out as fast as if it were in a Hot-bed; and the Apples grew so precipitantly, that they were of a very flashy Constitution, so as to rot more remarkably than had ever been remember'd.

The Planters observe, that when a Mould or Fen has once seiz'd any Part of the Ground, it soon runs over the Whole, and that the Grass and other Herbs under the Hops are infected with it; probably, because the small Seeds of this quick-growing Mould, which soon come to Maturity, are blown over the whole Ground; which spreading of the Seed, may be the Reason why some Grounds are infected with Fen for several Years successively, *viz.* From the Seeds of the last Year's Fen. Might it not then be advisable, to burn the Fenny Hop-Vines as soon as the Hops are pick'd, in hopes thereby to destroy some of the Seed of the Mould?

Mr. Austen of Canterbury observes Fen to be more fatal to those Grounds that are low and shelter'd, than to the high and open Grounds; to those that are shelving to the North, than

to those shelving to the South; to the Middle of Grounds, than to the Outfides; to the dry and gentle Grounds, than to the moist and stiff Grounds.

This was very apparent throughout the Plantations where the Land had the same Workmanship and Help bestow'd upon it, and was wrought at the same Time. But if in either of these Cases there was a Difference, it had a different Effect; and the low and gentle Grounds, that lay neglected, were then seen less distemper'd than the open and moist which were carefully managed and look'd after.

The Honey-Dews are observ'd to come about the 11th of June, which by the Middle of July turn the Leaves black, and make 'em stink.

The said Mr. Hales relates, that in the Month of July (the Season for Fire-blasts, as the Planters call them) he has seen the Vines in the Middle of the Hop-Ground scorch'd up almost from one End of a large Ground to the other, when a hot Gleam of Sun-shine has come immediately after a Shower of Rain, at which Time the Vapours are all seen with the naked Eye, but especially with reflecting Telescopes, to ascend so plentifully as to make a clear and distinct Object become immediately very dim and tremulous. Nor was there any dry gravelly Vein in the Ground along the Course of this Scorch: It was therefore, probably, owing to the much greater Quantity of scorching Vapours in the Middle, than the Outfides of the Ground; and that being a denser Medium, it was much hotter than a more rare Medium.

And, perhaps, the great Volume of ascending Vapours might make the Sun-beams converge a little towards the Middle of the Ground, that being a denser Medium, and thereby increase the Heat considerably: For he observ'd, that the Course of the scorched Hops was in Lines at Right Angles to the Sun-beams about Eleven o'Clock, at which Time the hot Gleam was.

The Hop-Ground was in a Valley which ran from South-West to North-East; and, to the best of his Remembrance, there was but little Wind, and that in the Course of the Scorch: But had there been some other gentle Wind, either North or South, 'tis not improbable but that the North Wind gently blowing the Volume of rising Wreak on the South-side of the Ground, that Side might have been most scorched; and so *vice versa*.

As to particular Fire-blasts which scorch here and there a few Hop-Vines, or one or two Branches of a Tree, without damaging the next adjoining; what Astronomers observe, may hint to us a no very improbable Cause of it, *viz.* They frequently observe (especially with reflecting Telescopes) small separate Portions of pellucid Vapours floating in the Air, which, tho' not visible to the naked Eye, are yet considerably denser than the circumambient Air: And Vapours of such a Degree of Density may very probably either acquire such a scalding Heat from the Sun, as will

scorch what Plants they touch, especially the more tender.

An Effect, which the Gardeners about *London* have too often found, to their Cost, when they have incautiously put Bell-glasses over their *Cauliflowers* early in a frosty Morning, before the Dew was evaporated off them; which Dew being rais'd by the Sun's Warmth, and confin'd within the Glass, did there form a dense, transparent, scalding Vapour, which burnt and kill'd the Plants.

Or perhaps the upper or lower Surface of these transparent, separate, flying Volumes of Vapours may, among the many Forms they revolve into, sometimes approach so near to an Hemisphere, or Hemi-cylinder, as thereby to make the Sun-beams converge, so as often to scorch the more tender Plants they shall fall on:

And sometimes also Parts of the more hardy Plants and Trees, in Proportion to the greater or lesser Convergency of the Sun's Rays.

The Learned *Boerhaave*, in his *Theory of Chymistry*, pag. 245, observes, That those white Clouds which appear in Summer-time, are, as it were, so many Mirrours, and occasion excessive Heat. These cloudy Mirrours are sometimes round, sometimes concave, polygonous, &c. When the Face of Heaven is cover'd with such White Clouds, the Sun shining among them, must, of Necessity, produce a vehement Heat; since many of his Rays, which would otherwise, perhaps, never touch our Earth, are hereby reflected to us: Thus, if the Sun be on one side, and the Clouds on the opposite one, they will be perfect Burning-glasses. And hence the Phenomena of Thunder.

I have sometimes (continues he) observ'd a kind of hollow Clouds full of Hail and Snow, during the Continuance of which the Heat was extreme; since, by such Condensation, they were enabled to reflect more strongly. After this, came a sharp Cold, and then the Clouds discharg'd their Hail in great Quantity, to which succeeded a moderate Warmth. Frozen concave Clouds therefore, by their great Reflexions, produce a vigorous Heat; and the same, when resolv'd, excessive Cold.

From which the Reverend Mr. *Hales* observes as follows:

Hence we see that Blasts may be occasion'd by the Reflexions of the Clouds, as well as by the above-mention'd Refraction of dense transparent Vapours.

But to return to the Management of *Hops*:

About the Middle of *July* *Hops* begin to blow, and will be ready to gather about *Bartholomew tide*: A Judgment may be made of their Ripeness, by their strong Scent, their Hardness, and the Brownish Colour of their Seed.

When by these Tokens they appear to be ripe, they must be pick'd with all the Expedition possible; for if at this Time a Storm of Wind should come, it would do them great Damage, by breaking the Branches, and bruising and discolouring the *Hops*. And it is very well known, that *Hops* being pick'd green and

bright, will sell for a third Part more than those which are discoloured and brown.

The most convenient way of picking them, is into a long square Frame of Wood call'd a *Binn*, with a Cloth hanging on Tenter-hooks within it, to receive the *Hops* as they are pick'd.

This Frame is compos'd of four Pieces of Wood join'd together, supported by four Legs, with a Prop at each End to bear up another long Piece of Wood plac'd at a convenient Height over the Middle of the *Binn*; this serves to lay the Poles upon which are to be pick'd.

This *Binn* is commonly eight Foot long, and three Foot broad; two Poles may be laid on it at a Time, and six or eight Persons may work at it, three or four on each Side.

It will be best to begin to pick the *Hops* on the East or North-side of your Ground, if you can do it conveniently; this will prevent the South-west Wind from breaking into the Garden.

Having made choice of a Plot of the Ground containing eleven Hills square, place the *Binn* upon the Hill which is in the Centre, having five Hills on each Side; and when these Hills are pick'd, remove the *Binn* into another Piece of Ground of the same Extent, and so proceed till the whole *Hop-Ground* is finish'd.

When the Poles are drawn up to be pick'd, you must take great Care not to cut the Binds too near the Hills, especially when the *Hops* are green, because it will make the Sap to flow excessively.

And if the Poles do not come up without Difficulty, they should be rais'd by a Piece of Wood in the Nature of a Lever, having a forked Piece of Iron with Teeth on the Inside, fasten'd within two Foot of the End.

The *Hops* must be pick'd very clean, *i. e.* free from Leaves and Stalks; and, as there shall be occasion, two or three times in a Day the *Binn* must be emptied into a *Hop-bag* made of coarse Linen Cloth, and carry'd immediately to the Oast or Kiln, in order to be dry'd: For if they should be long in the *Binn* or Bag, they will be apt to heat, and be discoloured.

If the Weather be hot, there should no more Poles be drawn than can be pick'd in an Hour; and they should be gather'd in fair Weather, if it can be, and when the *Hops* are dry; this will save some Expence in Firing, and preserve their Colour better when they are dry'd.

The best Method of Drying *Hops*, is with Charcoal on an Oast or Kiln cover'd with Hair-cloth, of the same Form and Fashion that is us'd for Drying of *Malt*. There's no need to give any particular Directions for the Making it; since every Carpenter or Bricklayer, in those Countries where *Hops* grow, or *Malt* is made, knows how to build them.

The Kiln ought to be square, and may be of ten, twelve, fourteen, or sixteen Feet over at the Top, where the *Hops* are laid, as your Plantation requires, and your Room will allow. There ought to be a due Proportion between

between the Height and the Breadth of the Kiln and the Beguels of the Steddle where the Fire is kept; *viz.* If the Kiln be twelve Feet square on the Top, it ought to be nine Feet high from the Fire, and the Steddle ought to be six Feet and an half square, and so proportionable in other Dimensions.

The *Hops* must be spread even upon the Oast a Foot thick or more, if the Depth of the Curb will allow it, but Care is to be taken not to over-load the Oast, if the *Hops* be green or wet.

The Oast ought to be first warm'd with a Fire before the *Hops* are laid on; and then an even steady Fire must be kept under them: It must not be too fierce at first, lest it scorch the *Hops*; nor must it be suffer'd to sink or slacken, but rather be increas'd till the *Hops* be nearer dry'd, lest the Moisture or Sweat which the Fire has rais'd, fall back or discolour them: When they have lain about nine Hours, they must be turn'd, and in two or three Hours more they may be taken off the Oast. It may be known when they are well dry'd by the Brittleness of the Stalks, and the easy falling off of the *Hop-Leaves*.

The *Dutch* and *Flemings* have another Method of drying their *Hops*: They make a square Kiln or Room about eight or ten Feet wide, built of Brick or Stone, having a Door at one Side, and a Fire-place in the Middle of the Room, on the Floor, about thirteen Inches wide within, and thirteen Inches high in Length from the Mouth of it almost to the Back-part of the Kiln, a Passage being left just enough for a Man to go round the End of it. This they call a *Horse*, such as is commonly made in Malt-kilns, the Fire passing out at Holes at each Side, and at the End of it.

The Bed or Floor, on which the *Hops* lie to be dry'd, is plac'd about five Feet high above; about that is a Wall, near four Feet high, to keep the *Hops* from falling.

A Window is made at one Side of the upper Bed, to shove off the dry *Hops* down into a Room prepar'd to receive them. The Beds are made of Laths or Rails sawn very even, lying a quarter of an Inch distant from one another, with a Cross-beam in the Middle to support them; the Laths are let in even with the Top of the Beam, and this keeps them even in their Places. This they call an Oast.

The *Hops* are laid on this Bed by Baskets full, without any Oast-cloth, beginning at one End, and so going on till all is cover'd half a Yard thick, without treading them; then they even them with a Rake, that they may lie of an equal Thickness.

This being done, they kindle the Fire below, either of Wood or Charcoal; but the latter is accounted the better Fuel for *Hops*: This Fire is kept as much as may be at an equal or constant heat, and only at the Mouth of the Furnace, for the Air will sufficiently disperse it.

They do not stir them till they are thoroughly dry'd, *i. e.* Till the Top is as fully dry'd as the Bottom; but if they find any Place not

to be so dry as the rest, (which may be known by reaching over them with a Stick or Wand, and touching them in several Places) they observe where they do not rattle, and where they do; and where they do not rattle, they abate them there, and dispose of them where the Places were first dry.

They know when they are thoroughly dry by the Brittleness of the inner Stalk, if it be short when it is rubb'd; which when they find, they take out the Fire, and shove out the *Hops* at the Window, that is made for that Purpose, into the Room made to receive them, with a Coal-Rake made with a Board at the End of a Pole; and then go in at the Door below, and sweep up the *Hops* and *Seeds* that fall through, and put them to the other *Hops*; then they lay another Bed of green *Hops*, and renew the Fire, and proceed as before.

This Method is disapprov'd by some, because they say, the *Hops* lying so thick, and not being turn'd, the under Part of them must needs dry before the upper, and the Fire passing through the whole Bed to dry the uppermost, must necessarily over-dry and much prejudice the greatest Part of the *Hops* both in Strength and Weight, besides the unnecessary Expence of Firing, which must be long continu'd to dry thoroughly so many together.

Therefore some have improv'd on this Method, and advis'd to make the Kiln much as is before directed as to the *Dutch Way*.

First, to make a Bed of flat Ledges about an Inch thick, and two or three Inches broad, sawn and laid across one another, the flat Way Chequerwise, at about three or four Inches Distance one from the other, the Edges being so enter'd one into the other, that the Floor may be even and smooth: This Bed may be made to rest on two or three Joists, set edgewise, to support it from sinking.

This Bed is to be cover'd with large double Tin, folder'd together at each Joint, and the Ledges must be so order'd, before they are laid, that the Joints of the Tin may always lie over the Middle of the Ledge, the Bed being wholly cover'd over with Tin, Boards must be fitted about the Edges of the Kiln, to keep up the *Hops*; but one Side must be made to remove, that the *Hops* may be shov'd off as before.

On this Bed or Floor of Tin, the *Hops* may be turn'd without such Hazard or Loss, as upon the Hair-cloth, and also it will require a less Expence of Fuel; and besides, any Sort of Fuel will serve in this Kiln as well as Charcoal, because the Smoke does not pass through the *Hops*, as it does the former Ways: But then Care is to be taken, that there be Passages made for it at the several Corners and Sides of the Kiln.

It is found by Experience, that the turning of *Hops*, though it be after the most easy and best Manner, is not only an Injury and Waste to the *Hops*, but also an Expence of Fuel and Time, because they require as much Fuel, and as long a Time to dry a small Quantity, by turning them, as a large one.

Now

Now this may be prevented, by having a Cover (to be let down and rais'd at Pleasure) to the upper Bed whereon the *Hops* lie.

This Cover may also be tinn'd, by nailing single Tin Plates over the Face of it, so that when the *Hops* begin to dry, and are ready to burn, *i. e.* when the greatest Part of their Moisture is evaporated, then the Cover may be let down within a Foot or less of the *Hops*, (like a Reverberatory) and will reflect the Heat upon them, so that the Top will soon be as dry as the Lowermost, and every *Hop* be equally dry'd.

As soon as the *Hops* are taken off the Kiln, lay them in a Room for three Weeks or a Month to cool, give and toughen, for if they are bagged immediately, they will powder; but if they lie a while, (and the longer they lie the better, provided they be cover'd close with Blankets to secure them from the Air) they may be bagged with more Safety, as not being liable to be broken to Powder in treading, and this will make them bear treading the better, and the harder they are trodden, the better they will keep.

The common Method of Bagging is as follows: They have an Hole made in an upper Floor, either round or square, large enough to receive a Hop-bag, (which consists of four Ells and an half of Ell-wide Cloth, and also contains ordinarily two hundred and an half of *Hops*); they tie a Handful of *Hops* in each lower Corner of the Bag, to serve as Handles to it; and they fasten the Mouth of the Hole, so plac'd that the Hoop may rest upon the Edges of the Hole.

Then he that is to tread the *Hops* down into the Bag, treads the *Hops* on every Side, another Person continually putting of them in as he treads them, till the Bag is full; which being well fill'd and trodden, they unrip the Fastening of the Bag to the Hoops and let it down, and close up the Mouth of the Bag, tying up a Handful of *Hops* in each Corner of the Mouth, as was done in the lower Part.

Hops being thus pack'd, if they have been well dry'd, and laid up in a dry Place, they will keep good several Years; but Care must be taken that they be neither destroy'd nor spoil'd by the Mice making their Nests in them.

The Crop of *Hops* being thus bestow'd, you are to provide for another; first by taking Care of the Poles against another Year, which are best to be laid up in a Shed, having first stripped off the Haulm from them: But if you have not that Conveniency, set up three Poles in the Form of a Triangle, or six Poles (as you please) wide at Bottom; and having set them into the Ground, with an Iron Pitcher, and bound them together at Top, set the rest of your Poles about them: And being thus dispos'd, none but those on the Outside will be subject to the Injuries of the Weather, for all the inner Poles will be kept dry, unless at the Top, whereas if they were on the Ground, they would receive more Damage in a Fortnight than by their standing all the rest of the Year.

In the Winter-time, provide your Soil and Manure for the *Hop-ground* against the following Spring.

If the Dung be rotten, mix it with two or three Parts of common Earth, and let it incorporate together till you have occasion to make use of it in making your *Hop-bills*; but if it be new Dung, then let it be mix'd as before, till the Spring come twelve Months, for new Dung is very injurious to *Hops*.

Dung of all Sorts was formerly more commonly made use of than now it is, especially when rotted and turn'd to Mould; and they who have no other Manure must use it: Which if they do, Cows or Hogs Dung, or human Ordure mix'd with Mud may be a proper Compost, because *Hops* delight most in a Manure that is cool and moist.

Some recommend Chalk or Lime as the best Manure, except in cold Lands, and in such, Pigeons Dung will do best; a little of which laid to a Hill, and so mix'd that it may not be too hot in a Place, is of great Advantage.

LUTEOLA; [so call'd of *Luteus*, Lat. *Yellow*, because it is us'd in dyeing a yellow Colour.] *Weld*, *Would*, *Yellow-weed*, or *Dyers-weed*.

The Characters are;

The Leaves are oblong and intire; it hath an anomalous Flower, consisting of many dissimilar Leaves; the Fruit is globular, hollow, and divided into three Parts.

The Species are;

1. **LUTEOLA**; *herba, Salicis folio. C.B.P.* Common *Weld*.

2. **LUTEOLA**; *minima Polygalæ folio. D. du Bois. Raii Syn.* Smallest *Weld*, with a Milk-wort Leaf.

The first of these Plants is very common in England, growing upon dry Banks and the Tops of Walls and Buildings almost every where; but the second Sort is very rare: This was found near *Tunbridge-Wells* by *Charles du Bois*, Esq; several Years since.

The common *Weld* is accounted a rich Dyer's Commodity, and is of great Advantage, considering the small Expence of its Culture: It will grow upon the poorest Sort of Land, provided it be dry, though upon a middling Soil it will grow much larger. The Seeds of this Plant should be sown the Beginning of *August*, soon after ripe; when it will come up with the first moist Weather, and will grow very strong the same *Autumn*, provided it be sown by itself, for most People sow it with Corn, which is very wrong, for that hinders its Progress greatly, and occasions the Loss of one whole Year. When the Plants are come up pretty strong, you should hoe them, (as is practis'd with *Turnips*) in order to destroy the Weeds, as also to cut up the Plants where they grow too thick, which will greatly improve them; and the succeeding Spring, if the Ground produces many Weeds, you should give it a second Hoeing in *April*, which will preserve it clean from Weeds; for after that the *Weld* will grow, and prevent the Weeds from coming to a Head afterwards.

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You must be very cautious in the Gathering of it, that the Seed be not over-ripe, so as to fall out, and that neither the Stalk or Seed be under-ripe; because if it be, both will be spoil'd. It must be pull'd up and bound in little Handfuls, and set to dry, as you do Flax, and then house it carefully, that you shake not out the Seed, which is easily beat out, and should be sown (as was before directed) soon after it is ripe.

This Seed is commonly sold for about Ten Shillings per Bushel, or more; a Gallon of which will sow an Acre, for it is very small.

There are some who recommend the sowing this Seed in the Spring, mixing it with a Crop, of Barley or Oats, and only harrow'd in with a Bush, or rolled with a Roller. But this is not a good Method; for the Barley or Oats will starve the *Weld*, and make it very poor: And, many times, the Seeds which are sown in the Spring, do not grow, or not come up, till the Autumn following; whereas that sown in the Beginning of August, rarely fails to come up soon after; and will be much stronger and fit to pull the succeeding Summer, when the other is always two Years before it is pull'd. The Dyers use it for dying of bright Yellows and Lemon Colours. 'Tis much sown in Kent, especially about Canterbury, and often yields from forty Shillings, to ten or twelve Pounds an Acre.

LYCHNIS, [so call'd, of *λύχνη* a Candle or Light, because the Flowers of this Plant imitate the Flame or Rays of Light.] *Campion*.

The Characters are;

The Leaves are whole, and grow opposite by Pairs upon the Stalks: The Cup of the Flower is whole, and either tubulous or swelling, and for the most part, furrow'd: The Flower consists of five Leaves, which expand in Form of a Clove-July-flower, and are generally Heart-shap'd: The Ovary, which rises in the Centre of the Calix, becomes a conical Fruit, which is wrapt up in the Flower-Cup, and has commonly one Cell, which is fill'd with Seeds, which are roundish, angular, and Kidney-shap'd.

The Species are;

1. **LYCHNIS**; *coronaria, Dioscoridis, sativa, flore dilute rubente*. C. B. P. Garden or Rose *Campion*, with a pale-red Flower.
2. **LYCHNIS**; *coronaria, Dioscoridis, sativa, flore rubro, velut flammeo fulgens*. C. B. P. Rose *Campion*, with a flaming red colour'd Flower.
3. **LYCHNIS**; *coronaria, sativa multiplex*. C. B. P. The Double Rose *Campion*.
4. **LYCHNIS**; *coronaria, sativa, Dioscoridis, flore albo*. C. B. P. The Single White Rose *Campion*.
5. **LYCHNIS**; *umbellifera, montana, Helvetica*. Zan. Umbelliferous Mountain *Campion* of Helvetia.
6. **LYCHNIS**; *alba, multiplex*. C. B. P. Double White *Campion*, commonly call'd The Double Batchelor's Button.
7. **LYCHNIS**; *purpurea, multiplex*. C. B. P. Double Red *Campion*, commonly call'd The Double Red Batchelor's Button.
8. **LYCHNIS**; *pratensis, flore laciniato, pleno*.

Mor. Hist. The Double Meadow *Campion*, with a jagged Flower, commonly call'd The Double Ragged Robin.

9. **LYCHNIS**; *birsuta, flore coccineo major*. C. B. P. The Scarlet *Lychnis*, Nonfuch, Jerusalem Cross, or Flower of Constantinople.

10. **LYCHNIS**; *birsuta, flore incarnato, major*. C. B. P. Great Hairy *Campion*, with a Flesh-colour'd Flower, commonly call'd The Pale *Lychnis* of Constantinople.

11. **LYCHNIS**; *Chalcedonica, flore pleno miniato, seu aurantiaco*. *Mor. Hist.* The Double Scarlet *Lychnis*, or Flower of Constantinople.

12. **LYCHNIS**; *seu saponaria, flore pleno*. Tourn. Double Soapwort; *vulgò*.

13. **LYCHNIS**; *sylvestris, quæ Beën album, vulgò*. C. B. P. Wild *Campion* Spatling Poppy, or White Behen of the Shops.

14. **LYCHNIS**; *sylvestris, viscosa, angustifolia rubra*. C. B. P. Red German Catchfly.

15. **LYCHNIS**; *sylvestris, viscosa, angustifolia rubra, flore pleno*. Red German Catchfly, with a Double Flower.

16. **LYCHNIS**; *Orientalis, bupleuri folio*. T. Cor. Eastern *Campion*, with a Hare's-ear Leaf.

17. **LYCHNIS**; *facie auriculæ urfi*. C. B. P. *Campion*, with the Face of an Auricula.

18. **LYCHNIS**; *maritima, saxatilis, foliis anacampserotis*. T. Cor. Maritime Rocky *Campion*, with an Orpine Leaf.

19. **LYCHNIS**; *noctiflora, angustifolia, odorata*. Tourn. Night-flower'd sweet-scented *Campion*, with a narrow Leaf.

20. **LYCHNIS**; *frutescens, myrtifolia, Beën albo similis*. C. B. P. Shrubby Myrtle leav'd *Campion*, like the White Behen.

21. **LYCHNIS**; *segetum, rubra, foliis perfoliata*. C. B. P. Red Corn-*Campion*, with thorough-wax Leaves.

22. **LYCHNIS**; *supina, Sicula, calice amplissimo, striato*. Tourn. Low Sicilian *Campion*, with a large streak'd Flower-cup.

23. **LYCHNIS**; *sylvestris, viscosa, angustifolia rubra, altera*. C. B. P. Another narrow-leav'd wild *Campion*, with a viscous Stalk, and red Flowers.

24. **LYCHNIS**; *viscosa, purpurea, latifolia lævis*. C. B. P. Purple Viscous *Campion*, with a broad smooth Leaf, commonly call'd Lobel's Catch-fly.

25. **LYCHNIS**; *viscosa, alba, latifolia lævis*. C. B. P. White flowering broad-leav'd Catch-fly.

26. **LYCHNIS**; *birsuta, minor, flore variegato*. Tourn. Small hairy *Campion*, with a variegated Flower, commonly call'd Dwarf *Lychnis*.

27. **LYCHNIS**; *Hispanica, folio Kali, multiflora*. Tourn. Spanish Many-flower'd *Campion*, with a Glass-wort Leaf.

28. **LYCHNIS**; *Hispanica, Valerianæ rubræ folio, purpurascens flore*. Tourn. Spanish *Campion*, with a red Valerian Leaf, and a purplish Flower.

29. **LYCHNIS**; *segetum, meridionalium, annua, birsuta, floribus rubris, uno versu dispositis*. *Mor. Hist.* Corn annual hairy *Campion*, with red Flowers dispos'd on one Side of the Stalk.

30. *LYCHNIS; sylvestris, alba, spica reflexa.* Bot. Monsp. White wild Campion, with a reflex'd Spike.

The first, second, and fourth Sorts are very common in most *English* Gardens: These are very hardy Plants, and easily propagated either by parting of their Roots, or from Seed; if by parting the Roots, it should be done about the Latter-end of *August*, or the Beginning of *September*, that they may take Root before the cold Weather comes on: They may be planted in any Situation, provided they have a light dry Soil. If you would propagate them from Seeds, they should be sown in *March* upon a Bed of fresh light Earth; and in *May* the Plants should be transplanted into another Bed of the like fresh Earth, at about six Inches Distance from each other; observing to water and shade 'em until they have taken Root; after which, they will require no farther Culture than to keep them clear from Weeds.

At *Michaelmas* following these Plants may be placed into the large Borders of the *Pleasure-Garden*, where, the Summer following, they will produce their Flowers in *June* and *July*; and soon after their Seeds will ripen, which, if permitted to shed on the Ground, will rise in the succeeding Spring, without any Care.

These Plants, when intermix'd with others of the like Size, do make an agreeable Variety during the Season of Flowering.

The *Double Rose Campion* is somewhat nicer, and requires more Care in its Culture than any of the former: This never produces any Seeds, and is therefore only to be propagated by parting the Roots; the best Time for which is in *August*, when the Heads taken off should be planted on a Bed of light fresh Earth; and if the Season should prove dry, they must be water'd and shaded until they have taken Root: After which, they must be kept clear from Weeds; and, during the Winter-season, they should be skreen'd from excessive Rains; for too much Moisture at that Season, very often rots them. In *March* they may be taken up with a Ball of Earth to their Roots, and transplanted either into the Borders of the *Flower-Garden*, or in Pots fill'd with light fresh Earth, and plac'd where they may have the Morning Sun 'till Eleven o' Clock, in which Situation they will thrive better than when they have more of the Sun. In dry Weather they must be frequently watered: but you should never let them have too much Wet, for that will canker and rot 'em, as will also a very rich Soil. This Plant commonly grows about two Feet high, and produces a great Number of beautiful red Flowers in *June* and *July*, which continue a long Time, for which they are greatly esteem'd.

The *Umbelliferous Mountain Campion* is nearly akin to the before-mention'd Sorts, but produces its Flowers in an Umbel upon the Top of the Stalks which are of a bright red Colour, and make a very pretty Variety in a Garden: This seldom grows above eight or nine Inches

high, therefore it should be placed amongst Flowers of the same Growth; it delights in a light fresh undung'd Soil, and shady Situation, and may be propagated either from Seeds, which it commonly affords in great Plenty, or from Slips, as the before-mention'd Sorts.

The *Red and White Batchelor's Button* are very hardy Plants, in respect to Cold: but if they are suffer'd to remain long in a Place unremov'd, they are very subject to rot and decay. They never produce Seeds, so are propagated only by parting of their Roots, which may be done either in *September*, or in the Beginning of *March*: but the former Season is preferable; for they will then be well rooted in the Ground before the dry Weather of the *Spring* comes on, whereby they will be out of Danger from that; whereas those planted in the *Spring*, if the Weather should prove dry soon after, will starve, and be very weak, unless frequently water'd: These commonly grow above two Feet high, and produce their Flowers in *June* and *July*: They love a fresh loamy Soil, which should not be dung'd, and to have a Situation to the Morning Sun, in which they will thrive better than in a more open Exposure.

The *Double Ragged Robin* is also increas'd by parting the Roots in *Autumn*: This Plant must have a moist Soil, and shady Situation, where it will thrive exceedingly: but in a hot dry Soil it seldom does well: It produces its Flowers about the same Time as the former, and is very proper for shady cold Borders, where few other Plants will thrive.

The *Single Scarlet Lychnis* may be either propagated by sowing the Seeds, or parting the Roots: If from Seeds, it should be sown on a Bed of light Earth in the Beginning of *March*; and when the Plants are come up pretty strong, (which is commonly in *May*) they should be transplanted out into Nursery-beds at about six Inches Distance each way, observing to water and shade them until they have taken Root; after which they will require no farther Care but only to keep them clear from Weeds until *Michaelmas*; at which time they may be remov'd into the Borders of the *Flower-Garden*, where the next Summer they will produce very strong Stems of Flowers: but if you would propagate them by parting the Roots, it should be done in *September*, (as was directed for the fore-mention'd Sorts). This Plant will grow in almost any Soil or Situation, but does best in a middling, loamy Soil, and an open Exposure.

The *Double Lychnis*, or *Nonfuch*, is only propagated by parting the Roots, or planting the Cuttings of its Flower-stems, which, if water'd and shaded, will take Root very well, and make good Plants. The best Season for parting the Roots is in *September*: but for planting the Cuttings, *July* is the most proper Season; in doing of this, you should take only the lower Parts of the Flower-stems, which generally succeed much better than the extreme Parts: The Cutting should have three Joints, two of which should be placed in the Ground,

Ground, and the third only left above-ground, from which the Shoot will be produc'd and make a good Plant; by which Method this beautiful Flower may be propagated much faster than from the Root alone.

This Plant delights in a fresh light Soil, which is not too dry, where it will produce very strong Stems, and rise about three Feet high. This flowers in *July*, and if the Season does not prove very hot, will continue in Beauty a whole Month, for which it is greatly esteem'd.

The *Double Sow-wort* is a Plant of no great Beauty; and being a very great Runner in Gardens, has been almost excluded from all curious Gardens: but as it is a Plant which requires very little Culture, so it may be admitted to have a Place in some abject Part of the Garden. This is propagated by its running Roots, which should be transplanted in *October*, and may be plac'd in any Soil and Situation, but should never stand near any other Plants, for it will over-run and destroy them. It may be planted under Trees in large Avenues, &c. where it will thrive very well, and in *August* will produce large Bunches of double Flowers, which are very proper to place in Chimnies, &c. or in Basins among other Flowers, where it will make a fine Appearance; and were it less common, it would be more esteem'd than it is at present.

The *Spattling Poppy* or *White Beben*, is a very common Plant in the Fields in most Parts of *England*, and is rarely cultivated in Gardens; but those who have a mind to preserve it for Medicinal Uses, may propagate it by sowing the Seeds in *March* on a Bed of common Earth, where the Plants will easily rise, and if kept clear from Weeds will soon overspread the Ground, and will continue for several Years.

The *Red German Catchflies*, both single and double, are easily propagated by parting the Roots, which should be done in *Autumn*, for if it be perform'd in the *Spring*, the dry Weather, which usually happens at that Season, greatly retards their Growth, whereby their Flowers are never so strong, nor produc'd in such Plenty as when they are remov'd in *Autumn*. These produce their Flowers in Spikes upon clammy Stalks, which grow about a Foot high, and flower in *April* and *May*: That with single Flowers always is the earliest, but the double Sort continues longest in Flower.

The single Sort may be propagated by Seeds, which should be sown in *March*, upon a Bed of light Earth; and when the Plants come up, they should be transplanted into Nursery-beds about six Inches asunder, where they will require no farther Care than to keep them clear from Weeds, and in very dry Weather to give them a little Water, and at *Michaelmas* they may be remov'd where they are design'd to remain.

The single flower'd Sort is not near so beautiful as the double, and therefore hardly worth propagating, since the Double is very easily multiply'd; especially if planted in a moist, light Soil, in which it will thrive exceedingly,

and produce strong Flowers. This Sort is very proper to plant in Pots, to adorn small Court-yards at the Time of its Flowering.

The sixteenth and nineteenth Sorts, are pretty Varieties in a Garden; and as they take up but little Room; and are not very nice in their Culture, they may have a Place amongst other Flowers of the same Growth. These are propagated by sowing their Seeds in *March*, upon a Bed of light, fresh Earth; and when the Plants are come up they should be transplanted into a Nursery-bed, as the former, and at *Michaelmas* may be remov'd into the Borders of the Flower Garden, where they are to remain. These Plants commonly grow about two Feet high; but as their Leaves are narrow, and the Flower-stems stand erect, so they take up very little Room, and their Roots will continue several Years, and annually produce large Quantities of Flowers: These delight in a fresh light dry Soil.

The seventeenth is a biennial Plant; and is only propagated by Seeds, which should be sown on a Border of fresh light Earth in *March*; and when the Plants are come up, they should be transplanted: some of which should be planted in Pots fill'd with the same fresh Earth, that they may be remov'd under Shelter in Winter, for it often happens, in severe Winters, that those Plants which are plac'd in the open Air are destroy'd; for which Reason it is advisable to have some of the Plants in Shelter to secure the Kind.

The other Plants may be planted in a Nursery-bed, as was directed for the former Kinds, where they may remain until *Michaelmas*; at which time they should be transplanted into warm Borders, and in a light dry Soil where they will endure the Cold of our ordinary Winters very well, and flower very strong the succeeding Summer. This Plant commonly grows three Feet high, and is apt to branch out pretty much, therefore should be supported by Stakes, otherwise the Wind often breaks down the Flower-stems before the Seeds are perfected.

The eighteenth Sort is also tender: This may be propagated by sowing the Seeds in the same manner as the former; and when the Plants come up, some of them should be planted into Pots fill'd with light fresh undung'd Earth, that they may be shelter'd in Winter; and the rest planted into a Nursery-Bed, which should be prepar'd of fresh light Earth that has not been dung'd; for Moisture and Richness in the Soil will destroy them: In this Place they may remain till *Michaelmas*, when they should be remov'd into very warm Borders; and if they are plac'd quite close to the Wall, where it is commonly very dry, they will succeed the better; as also planted on a dry, rubbishy Soil, for the Leaves of this Plant are very thick and succulent, as are all the Stems, so that it is as impatient of Wet as the *Sedum* or *Houfeleek*; and I do not certainly know whether this Plant would not bear a greater Share of Cold, if it was planted upon an old Wall or Building, where it might be always dry, and not have too much Nourishment from the Ground. The following Sum-

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mer this Plant will produce its Flowers, (which though they are not very beautiful, yet for the Oddness of the Plant it may have a Place in a good Garden) and the Seeds generally ripen in *August*: It may also be propagated by planting Cuttings in any of the Summer Months, which will take Root, and may be afterwards manag'd as the Seedling-plants.

The *Myrtle-leav'd, shrubby Campion* may be propagated by Seeds as the former, or increas'd by planting Cuttings in any of the Summer Months, which will soon after take root, and become strong Plants; some of which should be planted in Pots, that they may be shelter'd in Winter for fear of being lost, tho' they will endure the Cold of our Climate very well, if planted on a dry Soil. There is no great Beauty in this Plant, but it is preserv'd for Variety Sake in several curious Gardens.

The twenty-seventh and twenty eighth Sorts are abiding Plants, and may be propagated either by Seeds or parting their Roots, in the Manner which has been directed for the *Rose Campion*, and other Sorts before-mention'd: They are very hardy, and will grow upon almost any Soil or Situation: They produce their Flowers in *June* and *July*, and their Seeds ripen soon after.

The other Sorts are all of them annual Plants, which may be easily propagated by sowing their Seeds either in *March* or *August*, when the Plants will soon come up, and may be transplanted, while young, into the Places where they are design'd to remain; or the Seeds may be scatter'd in Patches upon the large Borders of the Flower Garden; and when the Plants are come up, they may be thin'd, leaving some of the strongest to flower in the same Places, and the other Plants may be remov'd into other Parts of the Garden.

Those Plants which come up in *Autumn* will be much larger, and flower earlier and stronger than those sown in the *Spring*, and will produce good Seeds; whereas it sometimes happens, in bad Seasons, that those sown in the *Spring* do often decay before their Seeds are perfected, tho' it is a good Method to sow at both Seasons, because hereby there will be a Succession of their Flowers, and two Chances for good Seeds.

The *Dwarf Lychnis* has been by some recommended to be sown for Edgings in large Gardens, but I think it by no means proper for that Purpose; for when the Plants grow very close together, they draw up weak, so that in hard Rains they are beaten down flat to the Ground, and the Flowers seldom continue long in Beauty, so that it does not afford any Pleasure above a Fortnight or three Weeks at most, after which it appears very unsightly, for when it is in Seed, the Weight of that forces it down upon the Ground; but when the Plants grow singly, they will be much larger and stronger, and continue longer in Flower.

The two Sorts of *Lobel's Catchfly* have been long cultivated in Gardens, and the Seeds are commonly sold at the Seed-shops in *London*:

These grow upright to the Height of sixteen or eighteen Inches, (if sown in the *Autumn*, but those which are sown in the *Spring* seldom grow so large) and produce pretty Tufts of Flowers upon the Tops of the Branches in Form of an Umbel, which continue a long time in Perfection, and are pretty Ornaments in a large Garden.

The twenty-second Sort spreads upon the Ground, and therefore must be allow'd more Room than the former. These Plants should be planted two Feet asunder, otherwise they will run into each other, (especially such as are sown in the *Autumn*) so that in wet Weather they are subject to rot and decay. This produces a great Number of beautiful red Flowers, which make a very agreeable Appearance during their Season of Flowering.

There are a great Number of Sorts more than I have here mention'd, which are preserv'd in curious Botanick Gardens for Variety Sake; but as most of them are Plants of little Beauty, so I thought it needless to enumerate them in this Place, since those here mention'd are the best worth propagating in a Flower-Garden.

But before I quit this Article, I shall beg Leave to add two Plants to this Genus by way of Appendix, tho', according to their Characters, they do not, in Strictness, belong to it, differing in their Flowers from the *Lychnis's*, which have their Flowers cut to the Bottom into five Parts; whereas the Flowers of these Kinds are intire, consisting of one Leaf: Which Distinction being not very great, the modern Botanists have thought proper to distinguish them by the Name of *Lychnidea*, which signifies something like a *Lychnis*. Of this Genus we have, at present, but two Species which are common in *England*, viz.

1. *LYCHNIDEA*; *Virginiana. Holstei ampliore folio, floribus umbellatis purpureis.* Rand. *Virginian Lychnidea*, with a broad Stitchwort Leaf and Purple Flowers growing in an Umbel.

2. *LYCHNIDEA*; *Caroliniana floribus quasi umbellatim dispositis, foliis lucidis, crassis, acutis.* Martyn. *Hist. Plant. Rar.* *Carolina Lychnidea*, with Flowers growing almost in an Umbel, and thick, shining, sharp-pointed Leaves.

These two Plants are propagated either by Cuttings, or parting of their Roots, for they do not produce Seed in this Country. The best Time to part their Roots is in the Beginning of *April*, just before they begin to shoot; when you should take up the Roots, and after having pared off the outer Part of the Ball of Earth, so as to see where the Heads divide distinctly, you must with a Knife separate them, so as to preserve some Buds upon the Top of each Division; then you may plant them either into Borders of fresh Earth, or Pots fill'd with good fresh loamy Earth, observing to water them, if the Season should prove dry, until they have taken Root; after which, those in the Borders will require no farther Care, but only to clear them from Weeds, and when the Flower-stems advance, to support them with Sticks; but those in the Pots must be frequently

quently water'd in dry Weather, otherwise they will soon decay.

The first of these Plants produces its Flowers in *May*; but the second seldom flowers till the Middle of *June*, so that they succeed each other: During their Season of flowering, they make a very handsome Appearance, and are very proper to cut for Basons and Flower-pots to adorn Chimnies and Halls at that Season: But the second Sort is a much fairer Plant than the first; the Stems of this Sort rise higher, and are stronger: The Flowers are larger, and of a deeper Colour; but it is not quite so hardy as the first, which will endure the severest Cold of our Climate in the open Air, whereas this must be shelter'd in hard Winters, otherwise it will be in Danger of suffering by the Cold, tho' in our common Winters it will endure abroad very well.

These Plants may also be propagated by Cuttings, which should be taken from the old Plants in *May* or *June*, and planted on a Border of fresh light Earth, observing to water and shade them, until they have taken Root; after which, you must observe to keep them clear from Weeds, and in very dry Weather repeat watering them as often as they shall seem to want it; and when they have obtain'd sufficient Strength to remove, they may be transplanted either into Pots or Borders, where they are to remain. By this Method you may greatly increase these Plants, which will supply the Defect of Seeds.

LYCOPERSICON; [of λύξ, a Wolf, and Persica, Lat. a Peach.] Love-Apples.

The Characters are;

It hath a Flower consisting of one Leaf, which expands in a circular Order, as doth that of the Nightshade; the Style afterwards becomes a roundish, soft, fleshy Fruit, which is divided into several Cells, wherein are contain'd many flat Seeds.

The Species are;

1. **LYCOPERSICON**; *Galen.* Aug. Yellow Love-Apple.
2. **LYCOPERSICON**; *Galen.* fructu rubro. Boerb. Ind. Love-Apple, with a Red Fruit.
3. **LYCOPERSICON**; fructu Cerasi luteo. Tourn. Love-Apple, with a Red Cherry-shap'd Fruit.
4. **LYCOPERSICON**; fructu Cerasi luteo. Tourn. Love-Apple, with a yellow Cherry-shap'd Fruit.
5. **LYCOPERSICON**; fructu striato, duro. Tourn. Love-Apple, with a hard channell'd Fruit.

There are some Varieties of these Plants in the Gardens of *Italy* and *Spain*, but those here mention'd are all the Sorts I have observ'd in the *English* Gardens.

These Plants are propagated by sowing their Seeds on a moderate Hot-bed in *March*; and when come up, they should be transplanted into another moderate Hot-bed, at about three Inches Distance from each other, observing to shade them until they have taken Root; after which they must have frequent Waterings,

and a large Share of fresh Air, for if they are too much drawn while young, they seldom do well afterwards.

In *May* these Plants should be transplanted, either into Pots fill'd with rich light Earth, or into the Borders of the Flower-Garden, observing to water and shade them until they have taken Root; and as the Branches are extended, they should be supported with Sticks, otherwise, when the Fruit begins to grow, it will press them down, and break them.

Those Plants which are plac'd in Pots, should be often water'd, otherwise they will come to little (for they are very drougthy Plants) but when they are planted in a rich moist Soil, they will grow to a prodigious Size, and produce large Quantities of Fruit; which in *Autumn*, when they are ripe, make an odd Figure, but the Plants emit so strong an Effluvia, as renders them unfit to stand near a Habitation, or any Place that is much frequented; for upon their being brush'd by the Cloaths, they send forth a very strong disagreeable Scent.

The *Italians* and *Spaniards* eat these Apples, as we do Cucumers, with Pepper, Oil and Salt, and some eat them stew'd in Sauces, &c. but considering their great Moisture and Coldness, the Nourishment they afford must be bad. The first of these Plants is the Sort directed for Medicinal Use, by the College in their Dispensatory.

LYCOTUS; [λύκος, of λύξ, a Wolf, and πούς a Foot, q. d. Wolf's-foot because the Antients fancied, that the Leaves of this Plant resembled the Foot of a Wolf] commonly call'd Water-horehound.

This Plant grows in great Plenty on moist Soils by the Sides of Ditches in most Parts of *England*, but is never cultivated in Gardens, so that it would be needless to say any thing more of it in this Place.

LYSIMACHIA; [This Plant was so call'd of *Lyfimachus* the Son of a King of *Sicily*, who is said to have first found it.] Lofe-strife.

The Characters are;

The Leaves (which are intire and oblong) are produc'd sometimes by Pairs, or three or four at each Joint of the Stalk; the Flower consists of one Leaf, which expands in a circular Order, and is cut into several Segments at the Top; the Fruit is globular, and opens at the Top, inclosing many Seeds fix'd to the Placenta.

The Species are;

1. **LYSIMACHIA**; lutea, major, quæ Dioscoridis. C. B. P. Common yellow Lofe-strife or Willow-herb.
2. **LYSIMACHIA**; lutea, major, quæ Dioscoridis, foliis quaternis. C. B. P. Greater yellow Lofe-strife or Willow-herb, with four Leaves at each Joint.
3. **LYSIMACHIA**; bifolia, flore luteo globoso. C. B. P. Lofe-strife, with two Leaves growing at each Joint, and yellow Flowers growing in round Heads.
4. **LYSIMACHIA**; Orientalis angustifolia, flore purpureo. F. Cor. Narrow-leav'd Eastern Lofe-strife, with a purple Flower.

5. *LYSIMACHIA*; *Hispanica, spicata, flore purpureo.* *Jeff.* Spanish Loose-strife, with purple Flowers growing in Spikes.

The first of these Plants is pretty common by Ditch-sides in many Parts of *England*, and is seldom cultivated in Gardens, tho' it is not a very despicable Plant, for it produces large Spikes of fine yellow Flowers in *July*; for which Reason it may be admitted into a cold wet Part of the Garden, where few others will thrive, whereby many a Spot of Ground may be render'd agreeable, which often produces little but gross Weeds. This Plant may be taken up in the Spring, from the native Places of its Growth, and transplanted where you intend it should grow, and it will soon increase, by its creeping Roots, to what Quantity you please. This Plant is order'd in the *College Dispensatory* for Medicinal Use.

The second Sort is not a Native of our Country, but when transplanted hither thrives equally with the former: This loves a moist rich Soil, and for Variety may be admitted into a Garden.

The third Sort is found in the North of *England* in great Plenty. This Plant is not very proper for a Garden, for the Roots spreading very far under-ground, will over-run whatever Plants stand near it; nor are the Flowers of any Beauty.

The fourth Sort is a Biennial Plant, which produces fine Spikes of small purple Flowers in *June*, and the Seeds are ripe in *August*.

This Plant may be propagated by sowing the Seeds soon after they are ripe (for if they are kept until the *Spring*, they seldom grow) upon a warm Border of light Earth; and when the Plants are come up, they should be transplanted into a Border of strong Earth, where they may have the Morning Sun; in which Place they should remain to flower, for it is a Plant that does not care to be often remov'd.

The fifth Sort is an abiding Plant, which may be propagated by parting its Roots. The best Season for this Work is at *Michaelmas*, when the Leaves begin to decay: It should be planted in a moist Soil and a shady Situation, or must be often water'd, otherwise it will not produce Flowers: It may also be propagated by sowing the Seeds in the same manner as the former; but those Plants which rise from Seeds seldom flower until the second Year, whereas those propagated from Off-sets will flower the succeeding Year. These produce their Flowers in *July*, and their Seeds ripen in *September*.

LYSIMACHIA GALERICULATA; *vide* *Cassida*.

LYSIMACHIA NON PAPPOSA; *vide* *Onagra*.

LYSIMACHIA SILIQUOSA; *vide* *Chamaenerion*.



MA

MACALEB; *vide* *Cerasus*.

MADDER; *vide* *Rubia Tinctorum*.

MAHALEB; *vide* *Cerasus*.

MAJORANA; [so call'd, as though *Major ad Vitam*, Lat. because it is said to prolong Life, or because it resembles *Marum*; it is probably the *Marum* of the Antients: It seems also to be the *Sampsuchus* of the Antients; or it may be call'd *Majorana* and *Amaractus*, of a Privative; and *μαραινω* to wither, because this Plant does not easily rot nor wither, for it is a very dry one.] *Marjoram*.

The Characters are;

It is a Verticillate Plant, whose Flower is compos'd of one Leaf: The Galea (or Crest) is upright, roundish, and divided into two Parts: The Barba (or Beard) is cut into three Segments, so as to appear almost like a quinquifid Flower: The Flowers are collected into a short, thick, round Head, and come out of a four-fold Order of Leaves, which are plac'd like Scales or Plates.

The Species are;

1. *MAJORANA*; *vulgaris*. C. B. P. Common sweet *Marjoram*.

2. *MAJORANA*; *rotundifolia, scutellata, exotica*. H. R. Par. Round-leav'd exotick *Marjoram*, with a Leaf shap'd like a Saucer.

3. *MAJORANA*, *Cretica, Origani folio, villosa, satureje odore, corymbis majoribus albis*. Hairy Candia *Marjoram*, with an Orange Leaf, a savoury Smell, and large, round, tufted, white Heads.

The first of these Plants is an Annual, and must be sown every Year: The Seeds of this are annually brought from *Marseilles* and other Places in the South of *France*, where it grows spontaneously, for it never ripens Seeds in this Country. The Seeds of this Plant should be sown the latter End of *March*, or the Beginning of *April*, upon a dry, warm Spot of Ground; and when the Plants come up, they must be carefully clear'd from Weeds (which, if permitted to grow, will soon over-run and destroy them) and in very dry Weather, the Beds should be often water'd, which will greatly promote the Growth of them.

In *June* these Plants will be pretty strong; at which time you should prepare some Beds of light rich Earth, into which you should transplant such of the Plants as require to be drawn out, where they come up too thick, at about four Inches Distance from each other, observing to water them, until they have taken Root; after which they will require no farther Care, but only to clear them from Weeds, and these Plants will grow strong, and produce a greater Number of Heads (or Knots, as they are commonly call'd) than those which remain'd in the Seed-beds unremov'd; for which it is much prefer'd to it in the Markets, where it is call'd *Knotted Marjoram*.

jeram to distinguish it from that which is not so. Towards the latter end of *July* these Plants will flower, which is the proper Season to pull them up for Medicinal Use, when they should be hung up in a shady Place to dry.

The second Sort is a perennial Plant, which is preserv'd by some curious Persons in Pots, and plac'd in the Green-house in Winter. This Sort never produces Seeds with us, but is easily propagated by planting Cuttings or Slips during any of the Summer-months, in a Bed of rich light Earth, observing to water and shade them until they have taken Root: At *Michaelmas* these Plants should be taken up and planted in Pots fill'd with rich light Earth; and when they are settled, they should be remov'd into the Green-house, placing them near to the Windows, that they may have a good Share of free Air when the Weather is mild: you must often refresh them with Water, but never give them too much at once, for that will rot them. With this Management the Plants may be preserv'd fresh through the whole Year, and will be in a Condition to gather for Nofegays any Part of the Winter, and have as good a Scent as the *Sweet Marjoram*.

The third Sort was sent into *England* by Sir *George Wheeler* from *Smyrna*, where it grows in great Plenty. This Plant rises to the Height of two or three Feet, and becomes woody, but never produces any Seeds with us; tho' it is easily propagated by planting Slips or Cuttings in any of the Summer Months, after the manner as was directed for the former Sort, and must be hous'd in Winter, tho' it must not be kept too close, for it only requires to be protected from great Rains and Frost, but should have as much free Air as possible in mild Weather, otherwise it is subject to draw and grow very weak.

MALABAR-NUT; *vide* Adhatoda.

MALA ÆTHIOPICA; *vide* Lycopersicon.

MALA ARMENIACA; *vide* Armeniaca.

MALA COTONEA; *vide* Cydonia.

MALA INSANA; *vide* Melongena.

MALACOIDES; [*Μαλακοὶς* ♂, of *μαλακόν* a Mallow, and *εἶδος* the Face.]

The Characters are;

It hath the Flower and Appearance of a Mallow; and hath a Fruit like that of a Bramble, but dry, which is compos'd of several Cells, collected into a sort of little Head or Button, in which are contain'd many Kidney-shap'd Seeds.

There is but one Species of this Plant, at present, in the *English* Gardens, which is,

MALACOIDES; *Betonica folio*. *Tourn. Malacoides*, with a Betony-leaf.

This Plant is propagated by sowing the Seeds in *March*, upon a Bed of fresh light Earth; and when the Plants are come up, they should be transplanted into a warm dry Border, where they are to remain, (for this Plant does not care for being often remov'd) and some of them may be planted in Pots, that they be shelter'd in Winter, for in very severe Frosts they are often destroy'd: The Summer fol-

lowing they will produce their Flowers in *June*, and if the Season be favourable, they will sometimes ripen Seeds, but this does not often happen in our Country. There is no great Beauty in this Plant, but it is preserv'd by such as are curious in Variety.

MALLOW; *vide* Malva.

MALLOW-TREE; *vide* Alhæa.

MALPIGHIA; Barbadoes-Cherry; *vulgo*.

The Characters are;

It hath a small quinquefid Calix, which consists of one Leaf, having bifid Segments: The Flower consists of five Leaves, which expand in form of a Rose, having several Stamina collected in form of a Tube: The Ovary in the Bottom of the Flower-cup becomes a globular fleshy soft Fruit, in which is a single Capsule containing three stony winged Nuts.

We have but one Species of this Plant in *England*, at present, which is,

MALPIGHIA; *mali punici facie*. *Plum. N.G. Malpighia*, with the Face of Pomegranate, commonly call'd in the *West-Indies*, Barbadoes-Cherry.

This Tree in the *West-Indies* rises to be fifteen or sixteen Feet high, where it produces great Quantities of a pleasant tart Fruit, for which Reason it is propagated in most of the Gardens in those Countries; but in *Europe* it is only preserv'd as a Curiosity by such Persons as delight in Variety. It is easily propagated by Seeds, (which should be procur'd from the *West-Indies*) and must be sown upon a Hot-bed in *February*; when the Plants are come up, they must be transplanted each into a separate small Pot fill'd with fresh light Earth, and plung'd into a Hot-bed of *Tanners-bark*, observing to shade them from the Violence of the Sun until they have taken Root, as also to water 'em from time to time as they may require; and when the Plants begin to acquire Strength, and the Season is warm, they should have a good Share of Air (especially in the Middle of the Day) by raising the Glasses with a Stone or Brick; and if the Glasses are wet, it will be proper to turn them, that those rancid Vapours may be dry'd up.

In *June* these Plants will have grown so as to fill the small Pots with their Roots; at which time they should be shaken out, (preserving the Earth intire about their Roots) and plac'd into larger Pots, which should be fill'd up with the same light fresh Earth, and plung'd again into the Hot-bed, observing to water them as before, as also to give them plenty of Air in hot Weather; and in the Heat of the Day, when the Sun is very hot, it will be proper to shade the Glasses with Mats.

By thus managing them, they will grow eighteen Inches high before Winter, and have pretty strong Stems, (provided they have had a sufficient Quantity of Air); but in *October*, when the Nights are cold, they should be remov'd into the Stove, where they should be plung'd into the *Tanners-Bark* with the *Papaw's*, and other *West-Indian* Plants; which

Stove

Stove should be kept up to *Anana's* Heat, as mark'd on Mr. *Fowler's Thermometers*, observing to water them in the Winter with Water that has stood twenty-four Hours in the Stove, so as to have acquir'd a Warmth proportional to the Air of the House.

The *Spring* following they must be shifted into larger Pots, and again plung'd into *Tannet's Bark*, in which they should constantly be kept, if you would have them vigorous: tho' they will live in a warm Stove without the Bark; but then they will not make near the Progress, nor appear so beautiful, as if kept in the *Tanner's Bark*; and it is probable they may be brought to produce Fruit in Time, where the Stoves are good, and proper Care is taken of their Management.

MALT-DUST is accounted a great Enricher of barren Ground: It contains in it a natural Heat and Sweetness, which gives the Earth whereon it is laid a proper Fermentation, as those who live in Malting Countries have found by Experience.

Some are of Opinion, that there is not a greater Sweetener than *Malt-Dust*, where the Grounds are natural Clay, and have contracted a Sourness and Austerity, whether by reason of its having lain long untill'd, and unexpos'd to the Air, or by reason of Water having stood long thereon.

MALVA; [so call'd of *μαλὰ λένω* or *μαλασσω*, to soften, because it is good to soften the Belly.] Mallows.

The Characters are;

It hath a fibrose Root: The Leaves are round, or angular: The Flower consists of one Leaf, is of the expanded Bell-shap'd Kind, and cut into five Segments almost to the Bottom: From the Centre rises a pyramidal Tube, for the most part loaded with many small Threads or Filaments: From the Centre of the Flower-cup rises the Pointal in the Tube, which becomes the Fruit, which is flat, round, and sometimes pointed, wrapt up, for the most part, within the Flower-cup, and divided into several Cells so dispos'd round the Axle, that each little Lodge appears most artificially jointed within the corresponding Striae or Channels: The Seed is, many times, shap'd like a Kidney.

The Species are;

1. MALVA, *vulgaris*, *flore majore*, *folio sinuato*. J. B. Common Mallow, with a large Flower.

2. MALVA; *sylvestris*, *folio sinuato*, *flore albo*. Sutherland. Common Mallow, with a large white Flower.

3. MALVA; *Sinensis*, *erecta*, *flosculis albis minimis*. China Upright Mallow, with small white Flowers.

4. MALVA; *foliis crispis*. C. B. P. The curl'd or furbeloe'd Mallow.

5. MALVA; *folio vario*. C. B. P. Mallow, with a variable Leaf.

6. MALVA; *Orientalis erectior*, *flore magno suave rubente*. T. Cor. Upright Oriental Mallow, with a large beautiful red Flower.

The first of these Plants is found wild in most Parts of England, but is rarely cultivated

in Gardens. This is the Sort commonly us'd in Medicine, with which the Markets are supply'd by the Herb-folks, who gather it in the Fields.

The second Sort is a Variety of the first, from which it differs in the Colour of the Flower: This is preserv'd by such as are curious in preserving great Varieties of Plants, but is rarely cultivated in other Gardens.

The third Sort was formerly sent from *China* as a Pot-herb, and hath been cultivated in some curious Gardens in *England*; though 'tis not likely to obtain here as an esculent Plant, since we have many others which are preferable to it for that Purpose. This is an annual Plant, which will propagate it self fast enough, provided it be permitted to scatter its Seeds, when they seldom fail to grow, and are often very troublesome when they have gotten Possession of the Ground.

The fourth Sort is preserv'd by some curious Persons for the Beauty of its Leaves, which are naturally furbeloe'd round their Edges: This is also an annual Plant, which will rise four or five Feet high, and propagate it self in the same manner as the former.

The fifth Sort is more rare than any of the former: It grows wild in *Spain* and *Italy*, from whence the Seeds were brought into *England*, and is preserv'd by the Lovers of Variety, but there is no great Beauty in the Plant.

The sixth Sort is also an annual Plant, which commonly grows upright to the Height of three or four Feet, and produces great Numbers of beautiful red Flowers; which renders it the best worth propagating in large Flower-Gardens, where being plac'd in the middle of large Borders, it makes a beautiful Appearance.

The Seeds of these Plants should be sown in March upon a Bed of fresh light Earth; and when they are come up four Inches high, they should be transplanted where they are design'd to be continu'd, allowing 'em a large Distance; for if they are planted too close, they do not appear so well: but they are best when intermix'd with other Flowers of the same Growth, where they afford an agreeable Variety.

These Seeds may also be sown in August; and the Plants will endure the greatest Cold of our Climate, if plac'd on a dry Soil, and grow larger, and flower sooner than those sown in the Spring: or if the Seeds are permitted to scatter, they will come up as the two former Sorts, and thrive equally as well.

There are several other Sorts of Mallows, some of which are Natives of this Country: but as they are Plants of no great Beauty or Use, so it would be superfluous to mention them in this Place.

MALVA ARBOREA; vide *Althæa*.

MALVA ROSEA; Rose Mallow, or Holyhock.

The Characters are;

It hath a larger and more expanded Flower than the Mallow, which closely adheres to the Stalk,

Stalk, and, in many Species, the Flowers are double, where the Petals occupy the Place of the Style: It is in every respect larger than the Common Mallow; the Leaves are rougher, and the Plant grows almost shrubby.

The Species are;

1. MALVA ROSEA; *five bortenfis, flore albo.* J. B. Single White Hollyhock.
2. MALVA; *bortenfis, flore simplici rubro.* H. Eyf. Single Red Hollyhock.
3. MALVA ROSEA; *folio rotundo, flore ex rubro nigricante.* C. B. P. Hollyhock, with a blackish-red Flower.
4. MALVA ROSEA; *folio subrotundo, flore simplici luteo.* H. R. Par. Hollyhock, with a Single Yellow Flower.
5. MALVA ROSEA; *folio subrotundo, flore pleno albo.* C. B. P. Double White Hollyhock.
6. MALVA; *bortenfis, flore pleno, rubro.* H. Eyf. Double Red Hollyhock.
7. MALVA ROSEA; *multiplex, flore incarnato.* H. Eyf. Hollyhock, with a Double Flesh-colour'd Flower.
8. MALVA; *bortenfis, flore pleno, atro-rubente.* H. Eyf. Double Hollyhock, with a Dark-red Flower.
9. MALVA ROSEA; *folio subrotundo, flore pleno, puniceo.* C. B. P. Hollyhock, with a Double Scarlet Flower.
10. MALVA ROSEA; *folio subrotundo, flore pleno, subluteo.* H. R. Par. Hollyhock, with a Double Yellowish Flower.

There are some other Varieties of these Plants, which differ in the Colour of their Flowers: but as they are near to one or other of these Colours, and are either paler or deeper, (none of the Sorts yet known being intirely different in Colour from those here mention'd); so it would be needless in this Place to insert all their minute Distinctions, especially as they are seminal Variations, and seldom produce the same exact Colours again from Seeds.

These Plants are all propagated from Seeds, which should be sown upon a Bed of fresh Earth in March; and when the Plants are come up pretty strong, they must be transplanted out into Nursery-beds at about eight Inches Distance from each other, observing to water them until they have taken Root: After which they will require no farther Care until the Michaelmas following, but only to keep them clear from Weeds; at which time they should be transplanted into Rows two Feet asunder, and a Foot Distance in the Rows; in which Place they may continue until they flower, when you should mark all those with Double Flowers, which have good Colours, with Sticks, that they may be transplanted into the Borders of large Gardens at Michaelmas, where they will remain four or five Years, and produce their Flowers very strong: but when the Roots are much older they begin to decay, and do not produce their Stems so strong, nor are their Flowers so large; wherefore there should always be a Supply of young Plants rais'd from Seeds every third or fourth Year, in

order to have the Flowers in Perfection: But it is the better way to change the Seeds every three or four Years, with some Person of Integrity who lives at a considerable Distance, and is exact to save Seeds from none but Double Flowers, and such as are well-colour'd; by which means you may preserve the Sorts well from degenerating: but if you constantly save the Seeds in the same Place, they will in a few Years become little worth.

The several Varieties of these Plants, when carefully intermix'd in large Wilderness Borders, or Avenues, afford an agreeable Prospect during their Season of flowering, (which is commonly in July) but as they grow to a considerable Height, and spread pretty wide, so they take up too much Room, and appear unsightly in small Flower Gardens: They should also be supported with Stakes, otherwise they are subject to be broken down by strong Winds.

When the Stalks of these Plants begin to decay, they should be cut down pretty close to the Ground, to encourage them [to shoot out fresh Heads for the succeeding Year, otherwise they sometimes rot and destroy the Roots.

MALUS: The Apple-Tree.

The Characters are;

The Tree groweth very large; the Branches spread, (and are more depressed than those of the Pear Tree); the Flower consists of five Leaves, which expand in form of a Rose; the Fruit is hollowed about the Footstalk, is for the most part roundish, and umbilicated at the Top, is fleshy, and divided into five Cells or Partitions, in each of which is lodg'd one oblong Seed.

The Species are;

1. MALUS; *sylvestris, acido fructu albo.* Tourn. The Crab Tree.
2. MALUS; *sylvestris, foliis ex albo eleganter variegatis.* Cat. Plant. Hort. The Crab Tree, with strip'd Leaves.
3. MALUS; *sylvestris, Virginiana, floribus odoratis.* Cat. Plant. Hort. Virginian Crab Tree, with sweet Flowers.
4. MALUS; *fructifera, flore fugaci.* H. R. Par. The Fig Apple.
5. MALUS; *pumila, quæ potius frutex, quam Arbor, fructu rubente & candido.* C. B. P. The Paradise Apple.
6. MALUS; *sativa, foliis eleganter variegatis.* Cat. Plant. Hort. Apple Tree, with strip'd Leaves.

The several Sorts of Apples which are at present esteem'd for their Fruit in the curious Gardens near London, may be seen under the Article of Apple, where a particular Account of their Planting, Pruning, &c. is fully laid down; to which I refer the Reader; and in this Place shall only take notice of the above-mention'd Sorts, which are only preserv'd as Curiosities, or for Stocks to graft the more generous Kinds of Fruit upon; the Crab-Tree is generally preferr'd to most other Sorts for this Purpose, it being the most durable of them, and not so liable to canker as those which are produc'd from Kernels of better

Apples; but these should be obtain'd from *Kernels*, and not *Suckers* taken from the *Woods*, which are generally ill-rooted, and seldom make a handsome *Stock*; nor will they so readily join with the *Cyon*, for which Reason they should not be planted.

The *Paradise Apple* hath, of late Years, greatly obtained for *Stocks* to graft or bud upon; but these are not of long *Duration*; nor will the *Trees* grafted upon them ever grow to any *Size*, unless they are planted so low as that the *Cyon* may strike *Root* into the *Ground*, when it will be equal to no *Stock*, for the *Graft* will draw its *Nourishment* from the *Ground*; so that it is only by way of *Curiosity*, or for very small *Gardens*, that these *Stocks* are proper, since there can never be expected any considerable *Quantity* of *Fruit* from such *Trees*.

The *Virginian Crab Tree* with sweet *Flowers*, is preserv'd by such *Persons* as are curious in collecting great *Variety* of *Trees*: It may be propagated by *Budding* or *Grafting* it upon the common *Crab* or *Apple-Tree*; but it is somewhat tender while young, wherefore it should be planted in a warm *Situation*, otherwise it will be subject to suffer by an extreme hard *Winter*. The *Flowers* of this *Tree* are said to be exceeding sweet in *Virginia*, where it grows in the *Woods* in great *Plenty*; but I could not observe much *Scent* in some of them which flower'd in *England* the last Year; so that I am in doubt whether the Sort at present in the *Gardens* is the very same with that of *Virginia*, or perhaps it may have degenerated by sowing the *Seeds*, which, I suppose, is the Way it was first obtain'd in *England*.

The *Fig-Apple* is suppos'd, by many *Persons*, to be produc'd without a previous *Flower*. But this *Opinion* is rejected by some curious *Observers*, who affirm, there is a small *Flower* precedes the *Fruit*, which is very fugacious, seldom continuing above a *Day* or two. Now, which of these *Opinions* is the right, I have not, as yet, had an *Opportunity* to determine, not having a *Tree* in my own *Possession* which is arriv'd at *Maturity* to produce *Fruit*; tho' it might reasonably be expected, that such, who have had *Trees* of this Kind several Years, might have determin'd this Point long ere this *Time*.

I remember an *Account* of a large *Tree* of this Kind, mention'd in a *Letter* from *New-England*, written by *Paul Dudley Esq*; to the *Royal Society*, and publish'd in the *Philosophical Transactions*, Numb. 385. which was exceeding large, and produc'd great *Quantities* of *Fruit*, without any previous *Flowers*; but it grew at some *Distance* from his *Habitation*, and he having no other *Opportunity* to observe it strictly himself, but by visiting the Place two or three times about the Season of *Flowering*, and not being appriz'd of the sudden *Decay* of the *Flowers*, they might easily be suppos'd to have appear'd, and dropt off between the *Times* of his visiting the Place.

The two Sorts with strip'd *Leaves* are preserv'd by such as are curious in collecting such

Varieties: These may be propagated by grafting or budding them upon the common *Apple* or *Crab-Tree*; but they should not be planted in a very rich *Soil*, which would cause them to grow very free, whereby their *Leaves* would become entirely green again.

MALUS ARMENIA; vide Armeniaca.

MALUS AURANTIA; vide Aurantia.

MALUS LIMONIA; vide Limonia.

MALUS MEDICA; vide Citreum.

MALUS PERSICA; vide Persica.

MALUS PUNICA; vide Punica.

MANDRAGORA: Mandrake.

The Characters are;

The Flower consists of one Leaf, in the Shape of a Bell, and is divided at the Top into several Parts: The Pointal afterwards becomes a globular soft Fruit, in which is contain'd many Kidney-shap'd Seeds.

The Species are;

1. MANDRAGORA; fructu rotundo. C. B. P. Common Mandrake, with a round Fruit.

2. MANDRAGORA; flore sub caeruleo purpurascens. C. B. P. Mandrake, with a purplish blue Flower.

These Plants are propagated by *Seeds*, which should be sown upon a *Bed* of light *Earth* soon after they are ripe; for, if they are kept until the *Spring*, they seldom succeed well; and, in the *Spring*, the Plants will appear above-ground, when they should be carefully clear'd from *Weeds*; and, in very dry *Weather*, they must be refresh'd with *Water*, which will greatly promote their *Growth*: In this *Bed* they should remain till the latter-end of *August* (observing always to keep them clear from *Weeds*) at which *Time* they should be taken up very carefully, and transplanted into the *Places* where they are to remain, which should be a light deep *Soil*, for their *Roots* do always run downward very deep; so that, if the *Soil* be wet, they are often rotted in *Winter*; and, if it be too near the *Gravel* or *Chalk*, they seldom thrive well; but, if the *Soil* be good, and they are not disturb'd, the Plants will grow to a large *Size* in a few Years, and will produce great *Quantities* of *Flowers* and *Fruit*, and they will abide a great many Years.

I have been inform'd, by some *Persons* of *Credit*, that one of these *Roots* will remain sound above fifty Years, and be as vigorous as a young Plant; but they should never be remov'd after their *Roots* have arriv'd to any considerable *Size*, which would break their lower *Fibres*, and so stunt the Plants, as that they will not recover their former *Strength* in two or three Years.

As to the feigned Resemblance of a *Human Form*, which the *Roots* of this Plant are said to carry, 'tis all *Imposture*, owing to the Cunning of *Quacks* and *Mountebanks*, who deceive

ceive the Populace and the Ignorant, with fictitious Images shap'd from the fresh Roots of *Briony* and other Plants: And what is reported as to the Manner of rooting up this Plant, by tying a Dog thereto, to prevent the certain Death of the Person who should dare to attempt it, and the Groans it emits upon the Force offer'd, &c. 'tis all a fulsome Fable, for I have taken up several large Roots of this Plant, some of which have been transplanted into other Places, but could never observe any particular Difference in this from any other deep-rooting Plant.

MAPLE; *vide* Acer.

MARACOCK; *vide* Granadilla.

MARCH: *Work to be done in the Kitchen-Garden.*

The Weather, in this Month, is generally more unsettled than in any other Month in the Year; sometimes it proves dry and frosty; at other times cold and wet, with Storms of Hail and strong Winds, which makes a diligent Attendance upon the Hot-beds of *Cucumbers* and *Melons* absolutely necessary, otherwise they often miscarry, or, at least, lose all their first Crop of Fruit: To avoid which, if your Beds have very much declin'd their Heat, you should add a new Lining of fresh Horse-dung round the Sides, to give them fresh Heat; as also observe to cover the Glasses very close with Mats every Night; but, in the Day-time, you must let them have fresh Air, by raising the Glasses in Proportion to the Heat of the Weather and the Beds; otherwise the Steam of the Beds being pent in, will occasion the Plants to grow mouldy and decay.

You must now plant *Beans*, and sow *Peas* to succeed those which were put in the last Month, as also *Cabbage*, *Imperial*, *Silesia* and *Cos* Lettuce's; plant out *Cauliflower*-Plants from their Winter-beds; and those *Cauliflowers* which were sown the last Month upon a Hot-bed, (in order to succeed those sown in August) should now be prick'd out upon a fresh Hot-bed, to bring them forward. Sow *Carrots*, *Parsnips*, *Onions*, *Leeks*, &c. if you have not already sown enough; as also *Radishes*, *Spinage*, and young *Sallet-herbs*, to succeed those sown in the former Months.

Sow *Cabbages* and *Savoys* for Winter Use, as also *Beets*, *Borage*, *Bugloss*, *Endive*, *Burnet*, *Dill*, &c. and, toward the latter End of the Month, if the Weather be mild, you may sow most Sorts of sweet Herbs, as *Thyme*, *Hyssop*, *Marjoram*, *Basil*, and *Lavender*.

Transplant and slip *Mint*, *Tarragon*, *Penny-Royal*, *Camomile*, *Skirrets*, *Balm*, *Savory*, *Sage*, *Rosemary*, and most other aromatick Plants, observing to do it when the Weather is moist.

About the Middle of this Month, you must fork the *Asparagus* Beds, being very careful not to hurt the Crown of the Roots; but you may defer raking them smooth, till the Beginning of next Month, whereby you will retard the Growth of Weeds, and that Season will

be early enough, provided it be done before the Buds appear above-ground.

Toward the End of this Month, you may plant new *Asparagus-beds*, if the Ground be dry; but, if it be wet, it will be better to defer it till the next Month.

Continue to make Hot-beds for *Cucumbers*, *Melons*, &c. to succeed those which were made the last Month; and sow *Melon* and *Cucumber-seeds*, to ridge out, under Bell or Hand-glasses the succeeding Month.

Sow *Celery* for early blanching about the Middle of this Month, which should have a warm Situation; for if the Weather should prove bad when the young Plants are just up, they are subject to be greatly injur'd, if too much expos'd to cold Winds.

Dress your Artichoaks, observing to leave only two or three of the clearest and best situated Plants upon each Root, slipping the rest clean off; the best of which may be now planted for a new Supply in *Autumn*, after those upon the old Roots are gone.

Sow all Sorts of young Sallet-herbs, as *Turnip*, *Rape*, *Radish*, *Mustard*, *Cresses*, *Lettuce*, &c. upon warm Borders, at two different times in this Month, that there may be no Want of young Sallet at the Table; for it will soon grow too large for Use.

Sow *Chardons* to be transplanted in *May*, and transplant *Silesia*, *Imperial*, *Cos* and *Brown Dutch Lettuces*, from the Beds in which they had remained all the Winter.

Product of the Kitchen-Garden this Month.

Winter *Spinage*, *Cabbages*, *Sprouts*, *Broccoli*, *Savoys*, *Coleworts*, *Red Beets*, *Carrots*, *Parsnips* and *Turnips*.

Upon the Hot-beds; *Cucumbers*, *Asparagus*, *Peas*, *Kidney-beans*, *Purslain*, &c. And, on the warm Borders, *Radishes*, and young *Sallet-herbs*; as also *Mint*, *Tansy*, *Tarragon*, &c. if planted upon a moderate Hot-bed the Beginning of *February*.

Work to be done in the Fruit-Garden and Nursery.

You must now finish pruning all the tender Sorts of Fruit-trees, as *Peaches*, *Nectarines*, *Apricocks*, &c. which were not prun'd the foregoing Months; and this being the Season when most of the early Fruits blossom, you must carefully guard them from Frosts, by covering them every Night with Mats or Canvas, but do not suffer them to remain cover'd all Day, except the Weather should prove very bad: And, if this Month should prove very dry, you should gently sprinkle your Fruit-trees with Water, which will be of great Service to them, provided it be done early enough in the Day, to be intirely dry before the Cool of the Evening comes on.

You may yet transplant Fruit-trees upon a moist Soil; but if your Ground can't be made ready by the Middle of the Month, you should take up the Trees out of the Nursery, and lay the Roots in the Ground, covering the Surface with some Litter, to prevent their Roots from being dry'd by the Sun and Wind; and this will

will check their early Budding, and prepare their Roots for planting; by which Means there will be little Danger of their not succeeding.

This is the chief Month for grafting most Sorts of Fruit-trees; beginning with *Cherries*, *Plumbs* and *Pears*, and ending with *Apples*: But this Work should be perform'd earlier or later according to the Season.

Cut off the Heads of such Stocks as were budded the last *Midsummer*, leaving about four Inches above the Bud, to fasten the Shoot to, which will be produc'd from the Bud, and prune the Stocks of the former Year's Grafts, which are still remaining in the Nursery where they were grafted.

You must now dig up the Ground between the Rows of Trees in the Nursery, which will encourage their Roots to strike out fresh, and preserve the Ground from noxious Weeds.

Dress and fresh-earth your Beds of *Raspberries*, and weed and string the Beds of *Strawberries*, which will cause them to produce a greater Quantity of Fruit.

Fruits still lasting: *Apples*, *Loan's Pearmain*, *Noupareil*, *Golden Russet*, *Winter Pearmain*, *Pile's Russet*, *John Apple*, *Pomme d'Api*, *Golden Pippin*, *Kentish Pippin*, *Holland Pippin*, *French Pippin*, *Stone Pippin*, *Wheeler's Russet*, with some others of less Note.

Pears: *Burgamot Bugi*, *Winter Boncretien*, *Double-flowering Royal d'Huyver*, *Bezi d'Chau-montelle*, *L'Amozelle*, *Union* or *Doctor Uvedale's St. Germain*, *Parkinson's Warden*, *Cadillac*, with some others.

Work to be done in the Flower Garden.

In this Month you may transplant most Sorts of fibrose-rooted Plants; as *Carnations*, *Pinks*, *Sweet Williams*, *Asters*, *Rose Campion*, *Lychnis's Perennial Sun-flowers*, *Thrift*, *Campanula's*, *French Honeyfuckle*, *Canterbury Bells*, with many other Sorts.

The Boxes with Seedling *Auricula's* and *Polyanthus's* (which Plants are now appearing above-ground) should be plac'd in the Shade, for one Day's Sun will destroy most of them while they're young.

You may, toward the latter End of this Month, sow *Carnation* and *Pink-seeds*; as also *Sweet Williams*, *Canterbury Bell*, *French Honeyfuckle*, *Flos Adonis*, *Candy Tuft*, *Venus Looking-glass*, *Venus Navel-wort*, *Sweet-scented Pea*, *Everlasting Pea*, *Scarlet Lychnis*, *Lobel's Catch-fly*, *Dwarf Lychnis*, *Lavatera*, *Large Upright Mallow*, *Venice Mallow*, *Stock July-flowers*, *Wall-flowers*, with most other hardy annual or perennial Plants.

Upon a moderate Hot-bed may now be sown *Marvel of Peru*, *French Marygold*, *African*, *Convolvulus's*, *Balsamines*, *Love Apple*, *Capscums*, and many other less hardy annual Plants, which, if sown too early, are apt to grow too large to be contain'd under the Glasses, till the Weather will permit their being transplanted into the open Air.

Make fresh Hot-beds to transplant such annual Plants which were sown the last Month, in order to bring them forward, otherwise they seldom grow to any considerable Size.

Stir and rake the Earth of your Borders, which will hinder the Growth of Weeds, and encourage the Flowers, and render them more agreeable to the Eye; and do the same to your Beds of *Tulips*, *Hyacinths*, *Anemonies*, *Ranunculus's*, and other bulbous and tubero-se-rooted Flowers, which will be of great Service to them: But you must be careful in doing of it not to injure their Roots, nor their Flower-buds, which now begin to appear: And as the Nights are often at this Season frosty, so you should carefully cover your Beds of choice Flowers with Mats or Canvas, to prevent their being injur'd thereby.

Plant some *Anemone-Roots* to flower late; and, if the Season prove dry, you must refresh them with Water once in two or three Days, otherwise they will come to little.

Give fresh Earth to the Pots of *Double Scarlet Lychnis's*, *Rose Campions*, *Campanula's* and other fibrose-rooted Plants, which were transplanted at *Michaelmas*; this will greatly strengthen them, and cause their Flower-stems to advance the sooner.

Dig up the Ground, in Wilderness-Quarters, between Flowering-Shrubs, if it were not done the last Month, which will make the Quarters clean from Weeds, and encourage the Shrubs to flower the stronger.

Toward the End of this Month, if the Weather be mild, and inclineable to Moisture, you may transplant Ever-greens, and many other Sorts of hardy Exotick-trees, observing to cover the Surface of the Ground with Mulch, to prevent their Roots from being dried by the Sun and Wind.

You may now sow the Seeds of *Bays*, *Cypress*, *Firs*, *Pines*, *Alaternus's*, *Phillyreas*, *Cedar of Libanus*, with many other ever-green and hardy Exotick-trees; and, toward the End of the Month, you may transplant such Ever-green and other Exotick-trees as were sown the preceding Year (and are now pretty strong Plants) either into Pots or Nursery-beds, as is directed under the several Articles of their Culture.

Cover your Pots of choice *Auricula's* in the Night, if the Weather be inclineable to Frost, for their Flower-stems beginning to advance, their Buds are often blighted with unseasonable Frosts, if they are exposed to the open Air, whereby they are render'd very poor.

Your Pots of choice *Carnations*, which were planted out to flower the last *Autumn*, should be pick'd and fresh-earth'd, which will greatly strengthen them.

Plants now in Flower.

Some *Anemonies*, *Crocus's* of several Colours, *Double Snow-Drop*, *Persian Iris*, *Dens Canis*, *Crown Imperials*, *Spring Cyclamen*, *Early*, *White Blue* and *Starry Hyacinths*, *Hepatica's*, *Double Pile-wort*, *Narcissus's* of several Sorts; *Early Tulips*, *Violets*, *Primroses*, *Polyanthus's*, *Green-flower'd Black Hellebore*, *Fennel-leaf'd Black Hellebore*, *Wall-Flowers*, *Double Dazies*, some *Auricula's*, *Dwarf Portugal Navel-wort*, with many others of less Note.

Hardy

Hardy Trees and Shrubs now in Flower.

Almond-Tree, Double-flower'd Peach, Virginian Cherry-Plumb, Mezereons, Spurge Laurel, Laurus-Tinus, Spanish Travellers Joy, Cornelian Cherry, Benjamin Tree, and some others.

Work to be done in the Green-house and Stove.

Water your *Oranges, Myrtles, Amomum Plinii's*, and other leis tender Exotick Plants frequently, and do not give them too much at once: And now begin to inure them to the Air by degrees, opening the Glasses in the Middle of the Day when the Weather is mild; you should also cleanse the Leaves from Filth, which they have contracted during their being confin'd in the Green-house.

You must now make new Hot-beds of Tanners-bark, in order to transplant such Seedling Exotick Plants as are come up from the Seeds sown the last Month, and plant tuberosé Roots into Pots of fresh Earth, and plunge them into a moderate Hot-bed.

At this Season the Bark-beds should be made in the Frames, for the *Anana's* or *Pine-Apple*, into which they should be plac'd towards the latter end of this Month, or the Beginning of the next. The Bark-beds of the Stove should also be stirr'd, and some fresh Bark intermix'd with the old, to renew the Heat; but this must be done in a warm Day, lest the Plants suffer by the Glasses being open'd to put in the Bark; you should also pick off all dead Leaves, and cut off all decay'd Branches from your tender Exoticks, and wash their Leaves and Stems, to cleanse them from Filth and Insects, both which they are often troubled with, which, if not clean'd off in time, frequently proves injurious to the Plants.

Now the Fires in the Stoves should be abated, but this must be done by Degrees, as the Weather increases warmer.

Sow the Kernels of *Citrons* and *Lemons* for Stocks to bud the several Kinds of *Oranges, Lemons* and *Citrons*, upon a moderate Hot-bed, observing frequently to refresh them with Water, which will greatly promote their Growth.

This is the Season to remove such *Orange-Trees*, as have almost lost their Heads by ill Management; when their Heads should be cut off, and their Roots prun'd and wash'd, and planted into fresh Earth, and plung'd into a Hot-bed of Tanners-bark, which will make them shoot again in a short time.

Plants now in Flower in the Green-house and Stove.

Several Sorts of *Ficoides's*; some Sorts of *Aloes, Sedum Arboreseus, Cbrysanthemum's, Anemonospermus* two or three Kinds; *Germaniums, Aleppo Cyclamens, Polygala Prutescens*; the *Anana's* or *Pine-Apple, Hermannia* two Sorts; *Ilex-leav'd Jasmine, Spanish Jasmine*, with some others.

MARJORAM; *vide* Marjorana.

MARLE, is a kind of Clay, which is become fatter, and of a more enriching Quality

by a better Fermentation, and by its having lain so deep in the Earth as not to have spent or weaken'd its fertilizing Quality by any Product.

Marle is suppos'd to be much of the Nature of *Chalk*, and is believ'd to be fertile from its salt and oily Quality, and that it contracts its Salts from the Air, and for that Reason is the better the longer it is expos'd to it.

Marles are of different Qualities in different Counties of *England*. There are reckon'd to be four Sorts of *Marles* in *Suffex*, a Grey, a Blue, a Yellow, and a Red: Of these the Blue is accounted the best, the Yellow the next, and the Grey the next to that; and as for the Red, that is the least durable.

The *Marle* in *Suffex* is most like Fuller's-Earth, and therefore must certainly be the fattest; whereas that in the *North-Country* runs much upon the Loam.

In *Cheeshire* they reckon six Sorts of *Marle*:

1. The *Cowshit Marle*, which is of a brownish Colour, with blue Veins in it, and little Lumps of Chalk or Lime-stone: It is commonly found under Clay or low black Land seven or eight Feet deep, and is very hard to dig.

2. *Stone, Stale, or Flag-Marle*, which is a kind of soft Stone, or rather Slate of a blue or bluish Colour, that will easily dissolve with Frost or Rain: This is found near Rivers and the Sides of Hills, and is a very lasting Sort of *Marle*.

In *Staffordshire* they esteem the *Dice* or *Slate-Marle* better than the *Clay-Marle*, and reckon the Blue best for Arable-Land, and the Grey for Pasture.

3. *Peat-Marle, or Delving-Marle*, which is close, strong, and very fat, of a brown Colour, and is found on the Sides of Hills, and in wet or boggy Grounds, which have a light Sand in them about two Feet or a Yard deep: This is accounted the strongest of all *Marles*, and is very good for sandy Land, but the Land must have a double Quantity laid on.

4. *Clay-Marle*; This resembles Clay, and is pretty near akin to it, but is fatter, and sometimes mix'd with Chalk-stones.

5. *Steel-Marle*; which lies commonly in the Bottom of Pits that are dug, and is of it self apt to break into cubical Bits: This is sometimes under sandy Land.

6. *Paper-Marle*; which resembles Leaves or Pieces of brown Paper, but something of a lighter Colour: This lies near Coals. This Sort is less esteem'd, it being hard to be got.

The Properties of any Sorts of *Marles*, and by which the Goodness of them may be best known, are better judg'd of by their Purity and Uncompoundedness, than their Colour; as if it will break in Pieces like Dice, or into thin Flakes, or is smooth like Lead-Ore, and is without a Mixture of Gravel or Sand; if it will flake like Slate-stones, and shatter after wet, or will turn to Dust when it has been expos'd to the Sun; or will not hang and stick together when it is thoroughly dry, like rough Clay; but is fat and tender, and will open the Land it is laid on, and not bind; it may

be taken for granted that it will be beneficial to it.

Some advise, to try the Goodness of *Marle*, by putting some of it into a Glass of Water; and they account it to be good, if it be so tender that the Lumps break and dissolve as soon as it comes to the Bottom: They also reckon it a good Sign, if it sparkle in the Water, and feel fat between the Fingers; but the surest Sign of its Goodness, is, if it dissolve by Wet or Frost.

Some approve of marling Land shallow, because, they say, it is apt to work downwards: Others, of laying it in deep at first, because the Sun wastes the Fatness of it.

Some recommend *Marles* for the improving of sandy loose Land: But the surest way to know what Lands it will suit best with, is, to try with a little of it on Lands suppos'd to be of a contrary Nature to it.

Marles do not make so good an Improvement of Lands the first Year, as afterwards.

Some advise, first to burn the *Marle* before it is laid on the Lands, which, if it be done, one Load will go as far as five.

The Quantity of the *Marle* ought to be in Proportion to the Depth of the Earth; and Over-marling has often prov'd of worse Consequence than Under-marling.

MARRUBIASTRUM; Bastard Horehound.

The Characters are;

It is one of the Verticillate Plants with a Lip-flower, consisting of one Leaf, whose Upper Lip is hollow like a Spoon, but the Lower Lip (or Beard) is cut into three Segments: Out of the Centre of the Flower rises the Pointal, attended, as it were, by four Embryo's, which afterwards turn to so many roundish Seeds. To which may be added, The little Flower-cup is cut into five small Segments, upon which are produc'd small Spines; and the Flowers grow in thick Whorles round the Stalk.

The Species are;

1. **MARRUBIASTRUM;** *vulgare*. Tourn. Common Bastard Horehound.

2. **MARRUBIASTRUM;** *sideritidis folio, caliculis aculeatis, flore candicante*. Tourn. Bastard Horehound, with an Ironwort Leaf, and a white Flower.

3. **MARRUBIASTRUM;** *sideritidis folio, caliculis, aculeatis, flore flavo cum limbo atropurpureo*. Tourn. Bastard Horehound, with an Ironwort Leaf, and a yellow Flower with a dark purple Edge.

4. **MARRUBIASTRUM;** *folio Cardicæ. Bocea. Muff.* Bastard Horehound, with a Motherwort Leaf.

The first of these Plants is found wild amongst the Corn in Kent, and some other Counties in England, and is seldom cultivated, except in Botanick Gardens, for the sake of Variety, where are also some other Species of this Plant preserved for the same Purpose.

The other three Sorts are found wild in the Southern Parts of France and Italy, from whence the Seeds have been sent to

the Curious in Botany in divers Parts of Europe.

These Plants may be all propagated by sowing their Seeds as soon as they are ripe, upon a Bed of light dry Soil, where they will come up the same Autumn, and abide the Cold of our ordinary Winters very well, and may be transplanted out in the Spring where they are to remain. In June they will flower, and their Seeds will be ripe in July or August.

MARRUBIUM; [Some derive the Name of מררוב, Heb. *Marrob*, i. e. bitter Juice; others, from the Latin Word *Marcidum*, because the Leaves of this Plant are so wrinkled that they appear to be withering.] Horehound.

The Characters are;

It is a verticillate Plant with a Lip-Flower consisting of one Leaf, whose Upper-Lip (or Crest) is upright with two Horns; but the Under-Lip (or Beard) is divided into three Parts: The Pointal, which is fix'd to the Hinder-Part of the Flower, is attended by four Embryo's, which become so many oblong Seeds, inclos'd in the Flower-Cup.

The Species are;

1. **MARRUBIUM;** *album, vulgare*. C. B. P. Common White Horehound.

2. **MARRUBIUM;** *album, latifolium, peregrinum*. C. B. P. Broad-leav'd Foreign White Horehound.

3. **MARRUBIUM;** *album, angustifolium, peregrinum*. C. B. P. Narrow-leav'd Foreign White Horehound.

4. **MARRUBIUM;** *Alysson distum, foliis profundè incis. H. L.* Horehound, call'd Madwort, with Leaves deeply cut in.

5. **MARRUBIUM;** *Hispanicum, supinum, foliis sericeis argenteis* Tourn. Low-Spanish Horehound, with Silken Silver-colour'd Leaves.

There are some other Species of this Plant, which are preserv'd in curious Botanick Gardens, for the sake of Variety: but as they are of no Use or Beauty, so it would be needless to enumerate them in this Place.

The first Sort here mention'd is us'd in Medicine: This is found wild in divers Parts of England. The other Sorts are only kept by such as delight in Variety of Plants; for they have no great Beauty in their Flowers, nor are there any Uses to which they are applied.

They may be all propagated by sowing their Seeds in March upon a Bed of fresh light Earth; and when they are come up, they should be transplanted out into a dry Soil, at about eighteen Inches or two Feet asunder, where they will require no farther Culture than only to keep them clear from Weeds. But the fourth Sort is somewhat tender, and should have a warm Situation, otherwise it would be often kill'd by Frosts.

MARRUBIUM NIGRUM; *vide* Ballore.

MARTAGON; *vide* Lilium.

MARVEL

MARVEL OF PERU; *vide* Jalapa.

MARUM, [of *Amarum*, Lat. Bitter, because this Plant is very bitter.] Mastick.

The Characters are;

It is a Plant with a Lip-Flower, consisting of one Leaf, but has no Galea (or Crest) the Stamina supplying the Place of it; but the Under-Lip is divided into five large Segments, the middlemost of which is hollow like a Spoon: These Flowers are produc'd single from the Wings of the Leaves. To which may be added, It has the Appearance of a Shrub, and a hot volatile Smell.

We have but one Species of this Plant, at present, in England, which is,

MARUM; *Syracum*, vel *Creticum*. H. L. Syrian Mastick, *vulgô*.

This Plant is propagated by planting Cuttings, in any of the Summer Months, upon a Bed of fresh light rich Earth, observing to water and shade them, until they have taken Root; after which, they may be transplanted either into Pots or Borders of the same fresh light rich Earth: But the greatest Difficulty is, to preserve it from the Cats, who will come from a great Distance to tear this Plant in Pieces, and from whom there is scarcely any guarding it, especially near Towns and Cities, where there are many of these Animals, unless by planting large Quantities of it; for it is observable, that where there are but few of them, the Cats will not leave them, until they have quite demolish'd them; whereas, when a large Quantity of the Plants are set in the same Place, they will not come near them.

Those Plants, which are put into Pots, should be shelter'd in Winter; but those in the full Ground, will abide the Cold of our ordinary Winters very well, provided they are planted on a warm dry Soil; and may be clip't into Pyramids or Balls, in which Figures I have seen some Plants of this Kind near three Feet high, which have endur'd the open Air several Years without any Covering.

MARUM VULGARE; *vide* Mastichina.

MARYGOLD; *vide* Caltha.

MARYGOLD (AFRICAN); *vide* Tagetes.

MARYGOLD (FIG); *vide* Ficoides.

MARYGOLD (FRENCH); *vide* Tagetes.

MASTER-WORT; *vide* Imperatoria.

MASTICHINA, [so call'd, of Mastick, because it has perfectly both the Smell and Virtue of that Plant. It is also call'd Marum, of its Bitterness.] Herb Mastick, or Mastick-Thyme.

The Characters are;

The Leaves are like those of Thyme, but larger: The Stalks are upright and shrubby: The Cup of the Flower is long, narrow, and tubulous, but is spread open at the Top, where it is cut into five long slender Segments, and has a Woolliness over every Part of it: The

Galea (or Crest) of the Flower stands upright, and is divided into two Parts: The Beard (or Lower-Lip) is divided into three Segments, so that it appears somewhat like a Flower with five Leaves: The Flowers are collected into thick Whorles, and have a white Down growing upon the oblong Heads.

The Species are;

1. MASTICHINA. Boerb. Ind. Herb Mastick; or Mastick-Thyme.

2. MASTICHINA; *folio minore*. Herb Mastick, with a lesser Leaf.

There seems to be another Variety of this Plant in some of the English Gardens, which is of humbler Growth than the Common Sort: The Spikes of Flowers are also shorter and looser; but the Leaves are full as large as those of the common Sort. This I don't remember to have seen taken notice of in any of the Books of Botany, tho' it seems constantly to retain this Difference.

These Plants may be propagated by planting Cuttings, during any of the Summer Months, in a Bed of light rich Earth, observing to water and shade them, until they have taken Root: After which they may be transplanted into a light dry Soil, and have a warm Situation, where they will endure the Cold of our ordinary Winters very well, and produce great Quantities of Flowers in July, but seldom ripen their Seeds in this Country.

The Flowering Part of this Plant is order'd as an Ingredient in *Venice Treacle*, for which Purpose it should be propagated in Physick-Gardens. And the Plant having an agreeable Scent, and being easily cultivated, may merit a Place in the Borders of every good Garden, where it may be reduced to a regular Head, and will appear very handsome.

MATRICARIA, [so call'd, from the Matrix, because this Plant is very good against Diseases of the Womb: And, for the same Reason, it is call'd *Parthenium*, of *Παρθένος* a Virgin.] Feverfew.

The Characters are;

It hath a fibrose Root: The Leaves are conjugated, and divided into many Segments: The Cup of the Flower is squamose, and hemispherical: The Flowers grow in an Umbel upon the Top of the Stalks, and the Rays of the Flower are for the most Part white.

The Species are;

1. MATRICARIA; *vulgaris*, vel *sativa*. C. B. P. Common Feverfew.

2. MATRICARIA; *vulgaris*, vel *sativa*; *caulibus rubentibus*. H. L. Common Feverfew, with reddish Stalks.

3. MATRICARIA; *vulgaris*, vel *sativa*, *floribus nudis bullatis*. H. L. Common Feverfew, with naked Flowers.

4. MATRICARIA; *vulgaris*, vel *sativa*, *florum petalis fistulosis*. H. L. Common Feverfew, with the Petals of the Flower quill'd or fistulous.

5. MATRICARIA; *vulgaris*, vel *sativa*, *florum petalis fistulosis* & *brevioribus*. H. L. Common Feverfew, with short fistulous Petals.

6. MATRICA

6. *MATRICARIA*; *flore pleno*. C. B. P. Double-flower'd Feverfew.

7. *MATRICARIA*; *flore pleno, petalis fistulosis*. H. L. Feverfew, with Double fistulous Flowers.

8. *MATRICARIA*; *flore pleno, petalis marginalibus planis, discoidibus fistulosis*. H. L. Double Feverfew, with the Petals round the Border plain, but those in the middle of the Flower fistulous.

9. *MATRICARIA*; *foliis elegantissime crispis, et petalis florum fistulosis*. Tourn. Feverfew, with elegant curl'd Leaves, and the Petals of the Flowers fistulous.

The first of these *Species* (which is the Sort used in Medicine) is found wild upon Dung-hills and uncultivated Places in divers Parts of *England*, but is cultivated in those Gardens which propagate medicinal Plants to supply the Markets. The other Sorts are preserv'd in curious Botanick Gardens for Variety: And the sixth, seventh, and eighth Sorts deserve a Place in the Borders of large Gardens, for the Beauty of their Flowers.

These Plants are propagated by their Seeds, which should be sown in *March*, upon a Bed of light Earth; and, when they are come up, they should be transplanted out into Nursery-beds, at about eight Inches asunder, where they may remain till the Middle of *May*, when they may be taken up, with a Ball of Earth to their Roots, and planted in the Middle of large Borders, where they will flower in *July* and *August*; and, if the *Autumn* be favourable, will produce ripe Seeds the same Year. But it is not advisable to permit them to seed, which often weakens and decays the Roots; therefore when their Flowers are past, you should cut down their Stems, which will cause them to push out fresh Heads, whereby the Roots will be maintain'd.

When the different Varieties of these Plants are intermix'd with other Plants of the same Growth, they make a handsome Appearance during their Season of Flowering, which commonly continues a full Month, or more, and renders them very valuable. But as their Roots seldom abide more than two or three Years, so fresh Plants should be rais'd from Seeds, to supply their Places; for altho' they may be propagated by parting their Roots either in Spring or Autumn, yet these seldom make so good Plants as those obtain'd from Seeds. But the sixth Sort seldom produces any good Seeds, therefore that must be propagated in this manner, or by planting Cuttings in the *Spring* or *Summer* Months, which will take Root, and make good Plants.

MATTED ROOTS, are such as are entangled or platted together.

MAUDLIN; *vide* *Ageratum*.

MAY: *Work to be done in the Kitchen-Garden.*

The Weather in this Month sometimes proves very hot and dry, which greatly retards the Growth of most Vegetables; and at other

times it is cold and moist, whereby the Markets are greatly stock'd with most Sorts of Esculent Plants; but as this occasions a great Plenty of most Sorts of Plants, so it also increases the Number and Sizes of Weeds, so that there will require a most diligent Care to keep them down, otherwise they will overgrow your Crops, and starve them, and occasion more Trouble to eradicate them when they have grown to a large Size, wherefore no Time should be lost in such a Season.

Your early Crops of *Spinage* and *Radishes* being now gone, the Ground should be clear'd from Weeds; and if there are *Cauliflowers* or *Cabbages* upon the same Ground, the Earth should be drawn up to their Stems to prevent their being dried by the Sun and Wind (but this should, if possible, be done after a Shower of Rain) which will be of great Service to the Plants.

About the twelfth Day of this Month, you should sow some *Cauliflower-seed* for Winter Use, which should be sown upon a Bed of light rich Earth, and, in hot Days, should be shaded with Mats, to prevent the Ground from drying too fast, which would spoil the Growth of the Seeds. You must also refresh it often with Water, which will bring up the Plants in a short time.

Toward the latter End of this Month, you should sow *Broccoli-seed* for Spring Use, observing the same Method as for the *Cauliflowers*. You must now plant *Cabbage* and *Savoy* Plants for Winter Use; but this should be done when the Weather is moist, otherwise it would be great Trouble to water them where there are large Quantities.

Look well to the *Cucumber* and *Melon* Beds, observing to shade the Glasses of those which are in Frames, during the Heat of the Day, which, at this Season, is too violent for them through the Glasses; and those Plants which have been brought up tenderly, cannot bear the open Air. You must now let those *Cucumbers* and *Melons*, which were planted out under Bell or Hand-glasses, have Liberty to grow, by setting the Glasses upon three Bricks, and laying out the Ends of the Plants; but if the Nights are very cold, it will be better to defer it a little longer, provided they are in no Danger of spoiling; or, if it be done, you should cover them with Mats every Night, till the Weather be better.

Plant out *Radishes* for Seed, allowing them two Feet Distance each Way, which is a better Method, than to let them remain for Seed where they were sown, because in transplanting, you can reject all such as have not long well-colour'd Roots, which can't be known of those which stand where they were sown.

Toward the latter End of this Month, you must sow *Cucumber-seed* for Pickling, in the manner as you'll find directed under its proper Head.

Sow *Purslain* in the common Ground, and *Endive* for Blanching, and transplant some of your early *Celery* into Drills.

Continue sowing all Sorts of young *Sallet-herbs* every Week, in a shady Situation, otherwise

wife they will soon be too large for Use; and sow some more Seeds of *Fenocchio* in Drills to succeed that sown the last Month; but this should have a moist Soil at this Season, otherwise it is apt to run to Seed before it arrives to any Size.

Hoe and clear from Weeds your Winter-Crops of *Onions*, *Leeks*, *Parsnips*, *Carrots*, &c. which, if well done at this Season, will save a great deal of Labour the succeeding Months, and be of great Service to the Crop.

You may now plant Slips or Cuttings of *Sage*, *Rosemary*, *Rue*, *Hyssop*, *Marum*, *Mastick*, and most other Aromatick Plants, observing to water and shade them till they have taken Root.

Sow *Runcival* and *Marrow-fat Peas* to come late, and plant *Beans* for the last Crop; but these must have a moist Soil, otherwise they seldom succeed well.

Transplant *Silesia*, *Imperial*, *Cos*, and *Brown Dutch Lettuces* into North Borders, to Cabbage late, and sow some of the common Cabbage and *Brown Dutch Lettuces* (to supply the Table in August and September) toward the End of this Month.

The early *Cauliflowers* will begin to appear in the Center of the Plants the Beginning of this Month, when you should look carefully after them to break down the inner Leaves to preserve them from changing yellow, which they will do, if expos'd to the Sun and Air.

Sow *Turnips* upon a moist Ground, observing to do it when there is a Prospect of some Rain in a short time, which will bring up the Plants very soon, and hoe those *Turnips* which were sown the last Month.

Your early *Cabbages* beginning now to turn their inner Leaves for Cabbaging, may be forwarded by tying them up with an Ozier-twig, as is often practis'd by the Gardeners near London.

Set *Kidney-beans* for a second Crop, for those planted the last Month will grow too old for Use by the Time these will be fit to gather; so that for a small Family there should be but few set at a time, but repeated at least three times, whereby there will always be a Supply of young *Beans* for the Table through the Season.

Products of the Kitchen Garden.

Radishes, *Spinage*, *Salletting* of all Sorts, *Cabbage*, *Brown Dutch*, *Silesia* and *Imperial Lettuces*, *Asparagus* in Plenty; *Early Peas* and *Beans*, *Cauliflowers* from under Bell-Glasses; young *Carrots*, *Artichokes*, *Kidney-beans* and *Cucumbers* upon Hot-beds; *Purslain* upon warm Borders, or on Hot-beds, with most Sorts of Spring Herbs.

Work to be done in the Fruit-Garden, &c.

You must now look carefully over your Wall and Espalier Trees, rubbing off all Fore-right Buds, or such as are luxuriant or ill-plac'd, and train in such kindly Branches as you would preserve horizontally, whereby you will prevent your Trees from growing into Confusion, and strengthen the Fruit-

branches, as also admit the Sun and Air to the Fruit, which is often obstructed by the luxuriant Growth of the Branches.

Pull off *Apricocks*, where they are too thick, in the Beginning of the Month, which will make those left on, much larger and better tasted; and about the middle of the Month, thin your *Peaches* and *Nectarines*, allowing them a Distance proportionable to the Size of the Fruit, for those which grow large, six Inches asunder is full near; for smaller Sorts four Inches Distance may be sufficient, provided the Trees are vigorous, otherwise they must not be left so thick: But it is very difficult to persuade People of the Necessity of this, most Persons being over-covetous of Fruit, when there is Plenty on the Trees; whereas they don't consider, that one Dozen of large, fair, well-nourish'd Fruit, is better than six times the Quantity of small starv'd Fruit, and will be esteem'd so in the Markets; and the Trees are always greatly injur'd, by leaving a greater Quantity of Fruit upon them than they can nourish, and are seldom recover'd in less than two or three Years after such a Weakening.

If the Season proves dry, you must not forget to water such Trees as were planted the last Season, now and then; in doing of which, you should sprinkle it all over the Branches, which will be of great Service to them.

In this Month you must go over your Vines, and stop such Shoots as have Fruit upon them at the second Joint beyond the Fruit, nailing the Branches close into the Wall: But such Shoots as are design'd for bearing the succeeding Summer, should be nail'd in regularly, but not shorten'd till the End of next Month: You must also rub off all trailing Branches and weak Shoots, which if suffer'd to remain, will cause a Confusion of Branches, and weaken the bearing Shoots: If this be duly observ'd, there never will be any Occasion to pull off the Leaves to let the Sun and Air to the Fruit, as is by some unskilful Gardeners practis'd at this time.

You must look carefully after Snails, especially in the Evening, and after a Shower of Rain, when they will come from behind the Branches of your Wall-trees, and may then be easily taken; for these are great Enemies to choice Fruit.

Keep the Ground about your Fruit-trees clear from Weeds, and all strong growing Plants, which at this Season will exhaust the Goodness of the Soil, to the no small Prejudice of your Trees; and this should also be carefully observ'd in the Nursery for the same Reason.

Fruits in Prime, or yet lasting.

Pears: *L'Amozelle*, or *Lord Cheyney's Green*, *Parkinson's Warden*, *Burgamot de Pacque*, *Bezy du Chaumontelle*, *Cadillac*, with some others.

Apples: *Golden Russet*, *Stone Pippin*, *John Apple*, *Oaken Pin*, *Pomme d'Api*, *Winter Russet*, and sometimes the *Nonpareil*; *May* and *May Duke-Cherries*; and in a warm Situation, some *Scarlet Strawberries*; in the Forcing-frame,

frame, *Masculine Apricocks*, *Nutmeg Peaches*, and some early *Plumbs*.

Work to be done in the Flower-Garden.

Take up your choice *Hyacinth-Roots*, which are past flowering, and lay them horizontally in a Bed of Earth to ripen, leaving their Leaves and Stems out of the Ground to decay, in the Manner directed under the Article of *Hyacinths*.

Shade your choice *Tulips* and *Ranunculus's*, which are now in Flower, whereby they will continue in Beauty much longer than if they were expos'd to the full Sun.

Take up the Roots of the true *Saffron*, when their green Leaves are decay'd, which may be kept above-ground until *July* before they are planted again.

Clean your Borders from Weeds; and about the middle of this Month you may plant out your hardy Annuals, such as *Marvel of Peru*, *French Marrygold*, *African*, *Balsamine*, &c. which if rightly intermix'd, will afford an agreeable Pleasure after the Beauties of the Spring and Summer are gone off.

Tye up the Spindles of *Carnations*, and the Stems of all such Flowers which have not yet blown, to prevent their being broken by Winds, &c.

Sow Dwarf annual Flowers upon your Borders in small Patches, where they are to remain, as *Candy Tufts*, *Venus Looking-glass*, *Dwarf Annual Stock*, *Dwarf Lycbuis*, *Lobel's Catchfly*, &c. and plant the several Sorts of *Lupines* and *Sweet Peas*.

Transplant such biennial Flowers, as were sown in *March* or *April* into Nursery-Beds, where they may remain till *Michaelmas*; when they must be planted into the Flower-borders.

Make a fresh Hot-bed for your choice Annuals, such as *Amaranths*, *Double-strip'd Balsamine*, &c. when they should be shifted into large Pots, and plung'd therein to make them strong.

Your *Auricula's* which are past flowering, should be remov'd into a shady Situation, where they must remain during the Summer-season; but don't let them be plac'd under the Drooping of Trees, which will rot and destroy them.

Transplant *Stock-July-flowers*, *Wall-flowers*, *Seedling Carnations*, and *Pinks*, and sow some more *Stock-July-flower* Seed of the *Scarlet* and *Brompton* Sorts; which Plants will be shorter, and more likely to endure the Winter than those which were sown sooner.

Toward the latter End of the Month you may take up the Roots of your early *Anemonies*, *Tulips*, and such other Sorts as have their Leaves quite decay'd.

Plants now in Flower.

Late Flowering Tulips, *Anemonies*, *Ranunculus's*, *Pinks* of several Sorts; *Lilly of the Valley*, *Double white Narcissus*, *Sea Narcissus*, *Tuberoze Iris's* of several Sorts; *White* and *Yellow Asphodel*, *Pulsatilla's*, *Double Rockets*, *Peonies* of several Sorts; *Corn-Flags*, *Yellow* and *Pompony Martagons*, *Englisch Hyacinths*,

Starry Hyacinth, *Hyacinth of Peru*, *Blue Grape Hyacinth*, *Feather'd Hyacinths*, *Bulbous Iris*, *Blue Aconite* or *Monk's-hood*, *Tradescant's Spiderwort*, *Savoy Spiderwort*, *Bulbous Fiery Lily*, *Yellow Tuberoze Lily*, *Red Day Lily*, *Double purple* and *large blue Periwinkle*, *Peach-leav'd* and *Nettle-leav'd Bell-flower*, *Fraxinella*, *white* and *red*; *Hedysarum Clypeatum*, *Lychnidea Virginiana*, *Double German Catchfly*, *Greek Valerian*, *white* and *blue*; *Double white* and *red Batchelors Button*, *Double white Mountain Ranunculus*, *Double ragged Robin*, *Helianthemums* several Kinds, *Jacea's* several Sorts; *Double Feverfew*, *Sea Ragwort*, *Veronica's* of several Sorts; *Digitalis* or *Fox-Glove*, two or three Sorts; *Bupbthalmums* two or three Sorts; with several others of less Note.

Hardy Trees and Shrubs now in Flower.

White, *Blue*, *Purple* and *Persian Lilacs*, *Elder Rose*, *Yellow Jasmine*, *Syringa*, *Early White*, *Italian* and *Common Honey-suckles*, *Cinquefoil-Tree*, *Laburnums*, two or three Sorts; *Bird-Cherry*, *Cornish-Cherry*, *Flowering Ash*, *Horse-Chesnut*, *Scarlet Horse-Chesnut*, *Persum'd Cherry*, *Cockspur Haw-thorn*, *Double Flowering Hawthorn*, *Male Cistus*, *Mallow-Tree*, *Arbor Juda*, *Cytisus Lunatus*, *Scorpion Sena*, *Bladder Sena*, *Cytisus Secundus*, *Clusia*, *Lotus* or *Nettle-Tree*, *Sea Buck-thorn*, *Spirea Salicis folio*, *Spirea Opuli folio*, *Spirea Hyperici folio*, *Monkly*, *Cinnamon*, *Damask* and *Burnet-leav'd Roses*, with some others.

Work to be done in the Green-house and Stove, &c.

If the Weather be gentle and settled, toward the Middle of this Month, you should bring forth your *Orange-Trees*, and, if possible, take the Advantage of a Shower of Rain for this Work, which will wash the Dust from the Surface of their Leaves, and greatly refresh them: You should at this Time (if you have not done it before) take out the Earth from the Top of the Pots or Tubs, and put in fresh rich Earth in the Place, which will greatly encourage their Flowering, and cause them to make vigorous Shoots; and if their Stems have not been cleaned the preceding Month, it should be now done.

You may now inarch *Oranges*, *Jasmines*, and other tender Exotick Trees, observing to place them where they may be shelter'd from strong Winds.

In the Middle of the Day, if the Weather prove hot, you should shade the Glasses of the Stove, and the Hot-beds of *Anana's* and other young Exotick Plants; and such of the tender Exoticks as want shifting, should now be remov'd into larger Pots, giving them fresh Earth, and then plunge them into the Hot-bed again.

Toward the latter End of the Month, make Cuttings of *Ficoidea's*, *Sedums*, *Cotyledons*, *Cereus's*, *Euphorbiums*, and other Succulent Plants, laying them in a dry shady Place a Week or more before they are planted, that the wounded Part may be healed up, otherwise they are subject to rot.

Make Layers of *Myrtles*, *Pomegranates*, *Jasmines*, *Granadilla's*, and other tender Shrubs

in this Month, observing to water them in dry Weather, which will greatly facilitate their Rooting.

Cleanse the Leaves of your *Aloes* and other tender Succulent Plants from the Filth they have contracted in the House the last Winter, and cut off all decay'd Leaves and dead Parts of these Plants, for now their Wounds will be soon heal'd.

Bring out all the hardy Exotick Plants, such as *Geranium's*, *Cistus's*, *Alaternoides*, *Sorrel-Tree*, *Amber-Tree*, *Anemonospermus's*, and several other Sorts which will now bear the open Air, observing not to expose them at first too much to the Sun, which will greatly change the Colour of their Leaves, and deface the Beauty of the Plants.

Those Exotick Plants which are still continu'd in the House, should have a great Share of fresh Air whenever the Weather is mild, otherwise they will draw and grow pale colour'd; but when the Sun is very hot, they should be screen'd therefrom.

Plants now in Flower in the Green-house and Stove.

Several Sorts of *Ficoides's*, some *Geraniums*, *Aloes*, *Oranges*, *Aloe-leav'd Asphodel*, *Onion-leav'd Asphodel*, *African Scabious*, *Anemonospermus's*, *Salvia Africana flore aureo magno*, *Phlomis's* several Sorts, *Polygala Africana*, *The Humble Plant*, *Ricinoides folio multifido*, *Lotus Argentea Cretica*, with some others.

MAYS; Indian Wheat.

The Characters are;

The whole Plant has the Appearance of a Reed: The Male Flowers are produc'd at remote Distances from the Fruit on the same Plant, growing, for the most part, in a Spike upon the Tip of the Stalk: The Female Flowers are produc'd from the Wings of the Leaves, and are surrounded by three or four Leaves, which closely adhere to the Fruit until it is ripe.

The Species are;

1. MAYS; *granis aureis*. Tourn. Common Indian Wheat, with yellow Grains.
2. MAYS; *granis albicantibus*. Tourn. Indian Wheat, with white Grains.
3. MAYS; *granis rubris*. Tourn. Indian Wheat, with red Grains.
4. MAYS; *granis violaceis*. Tourn. Indian Wheat, with Violet-colour'd Grains.
5. MAYS; *minor, granis rubris*. Lesser Indian Wheat, with yellow Flowers.
6. MAYS; *minor, granis rubris*. Lesser Indian Wheat, with red Grains.
7. MAYS; *minor, granis violaceis*. Lesser Indian Wheat, with Violet-colour'd Grains.

There are some other Varieties in the Colour of the Grains of this Plant, which are chiefly occasion'd by the interchanging of the *Farina* of one Sort with that of another, whereby the Spikes are often of two or three different Colours, as it commonly happens when the several Colours are planted in the same Spot of Ground.

This Plant is seldom propagated in England

but as a Curiosity in some curious Gardens; but in *America* it is one of their greatest Supports, and is there cultivated with great Care, in the following manner:

They dig the Ground well in the Spring, and, after having dress'd it well, they draw a Line across the whole Width of the Piece intended to be planted; then they raise little Hills of Earth at about three Feet Distance, into each of which they plant two or three good Seeds, covering them about an Inch thick with Earth; then they move the Line four Feet farther, continuing to do the same through the whole Spot of Ground, so that the Rows may be four Feet asunder, and the Hills in the Rows at three Feet Distance. Six Quarts of this Seed is generally allow'd to an Acre of Ground, which, if the Soil be good, will commonly produce fifty Bushels of Corn.

If, in the planting of this Corn, you observe to put the Grains of any one Colour in a Field by it self, and no other colour'd Grain stand near it, it will produce all of the same Colour again, (as hath been affirm'd by several curious Persons in that Country): but if you plant them in Rows of the different Colours alternately, they will interchange, and produce a Mixture of all the Sorts in the same Row, and frequently on one and the same Spike. Nay, it is affirm'd, that they will mix with each other at the Distance of three or four Rods, provided there be no tall Fence or Building between to intercept 'em.

There is nothing more observ'd in the Culture of this Plant, but only to keep it clean from Weeds, by frequently hoeing the Ground, and, when the Stems are advanc'd, to draw the Earth up in a Hill about each Plant; which, if done after a Shower of Rain, will greatly strengthen them, and preserve the Ground about their Roots moist a long Time.

When the Corn is ripe, they cut off the Stems close to the Ground; and after having gather'd off the Spikes of Corn, they spread the Stalks to harden and dry, which they afterwards use for covering of Sheds, &c. for which Purpose it is very useful to the Inhabitants of the warm Parts of *America*, as also for feeding their Cattle, while green, which is what they often use, when other Fodder is scarce.

But notwithstanding this Plant at present is only cultivated as a Curiosity in *England*, yet it is probable it might be propagated with good Success, and become a Piece of Good-husbandry in such Places where *Beans* will not succeed, as particularly in light sandy Lands, (where the Inhabitants are at a great Loss for hearty Fodder for their Cattle) upon which this Plant will succeed extremely well, and supply the Want of *Beans*, perhaps better than any other Plant. The small Sort is what I would recommend to be sown in *England*, which is what the Inhabitants of *North-America* cultivate; and this will perfect its Seeds in less than four Months from sowing, as I have several times proved; and even in some of the most unfavourable Years, it has ripen'd in full four Months from sowing.

In

In cultivating this Plant, the Ground should be well plough'd and dress'd, and the Rows of Corn placed four or five Feet asunder, and about two Feet asunder in the Rows; so that with a small Breast-Plough the Ground may be often stirr'd, whereby the Weeds will be intirely destroy'd; which, if duly observ'd while the Plants are young, there will be no occasion to repeat it, after they are got up to a Height; for then the Plants will prevent the Growth of Weeds, by overshadowing the whole Ground.

The best time to plant these Seeds is in the Beginning of *April*, when the Weather is settled; for if it be sown too soon, the cold Nights and wet Weather often destroy the Seeds; and if it be sown too late, and the Autumn should prove bad, it would not ripen well.

The large Sort, when cultivated as a Curiosity, should be sown upon a moderate Hot-bed in the Beginning of *March*; and in the Middle of *April* they should be carefully transplanted where they are to remain; and if the Season proves favourable, the Seeds will ripen very well: but without being thus early rais'd, this Sort seldom comes to much in this Country.

MEADOW SAFFRON; *vide Colchicum.*

MEDICA; [This Plant takes its Name from *Media*, (as *Pliny* writes); because that when *Darius Hystaspis* carry'd his Army into *Greece*, he had with him a great many Sacks of this Seed for Provender for his Cattle, and so the Seeds came to be scatter'd in *Greece*. This Plant is much cultivated in *France*, and there it is call'd *Burgundian Hay*: It is more filling and nutritious than double the Quantity of *Grass*; and the Herds, by that means, become very plethorick, so that they require Blood-letting the oftner.] *Medick*, or *La Lucerne*.

The Characters are;

It hath a papilionaceous (or Butterfly) Flower, out of whose Empalement rises the Pointal, which afterwards becomes an intorted Pod somewhat like a Ram's Horn, in which are lodg'd Kidney-shap'd Seeds.

The Species are;

1. **MEDICA**; *major erectior, floribus purpurascens*. *J. B.* Greater Upright *Medick*, or *La Lucerne*, with purplish Flowers.

2. **MEDICA**; *major, erectior, floribus violaceis*. *Tourn.* Greater Upright *Medick*, or *La Lucerne*, with Violet-colour'd Flowers.

3. **MEDICA**; *major, erectior, floribus luteis*. *Tourn.* Greater Upright *Medick*, or *La Lucerne*, with yellow Flowers.

4. **MEDICA**; *major, erectior, floribus ex violaceo & luteo mixtis*. *Tourn.* Greater Upright *Medick*, or *La Lucerne*, with Violet and Yellow Flowers mix'd.

These Plants do not greatly differ from each other but in the Colour of their Flowers; tho' I think that with the Violet-colour'd Flower produces the largest Leaves, and strongest Shoots; and that with the yellow Flowers,

the smallest Leaves, and weakest Shoots: so that the Violet-colour'd Flowering is the best Sort to cultivate for Fodder.

This Plant is suppos'd to have been brought originally from *Media*, and from thence had its Name *Medica*: It is by the *Spaniards* call'd *Alfafa*; by the *French*, *La Lucerne*, and *Grande Trefle*; and by several Botanick Writers it is call'd *Fœnum Burgundiacum*, i. e. *Burgundian Hay*. But there is little Room to doubt of this being the *Medica* of *Virgil*, *Columella*, *Palladius*, and other ancient Writers of Husbandry, who have not been wanting to extol the Goodness of this Fodder, and have given Direction for the Cultivation of it in those Countries where they liv'd.

But notwithstanding it was so much commended by the Antients, and hath been cultivated to so good Purpose by our Neighbours in *France* and *Switzerland* for many Years, it hath not as yet found Reception in our Country, in any considerable Quantity: Tho' it is evident, it will succeed as well in *England* as in either of the before mention'd Countries, being extreme hardy, and resisting the severest Cold of our Climate: Nay, I have had the Seeds which have happen'd to be scatter'd upon the Ground in Autumn, come up and endure the Cold of a severe Winter, and make very strong Plants.

About the Year 1650, the Seeds thereof were brought over from *France*, and sown in *England*: but whether for want of Skill in its Culture, whereby it did not succeed, or that the People were so fond of going on in their old beaten Road, as not to try the Experiment, whether it would succeed here, or not, was the Occasion of its being intirely neglected in *England*, I cannot say. However, I hope, before I quit this Article, to give such Directions for its Culture, as will encourage the People of *England* to make farther Trial of this valuable Plant, which grows in the greatest Heat, and also in very cold Countries, with this Difference only, that in very hot Countries, such as the *Spanish West-Indies*, &c. where it is the chief Fodder for their Cattle at this time, they cut it every Month, whereas in cold Countries it is seldom cut oftner than two or three times a Year. And it is very likely that this Plant will be of great Service to the Inhabitants of *Barbadoes*, *Jamaica*, and the other hot Islands in the *West-Indies*, where one of the greatest Things they want is Fodder for their Cattle; since, by the Account given of this Plant by *Pere Fuillee* it thrives exceedingly in the *Spanish West-Indies*, particularly about *Lima*, where they cut it every Week, and bring it into the Market to sell, and is there the only Fodder cultivated.

It is also very common in *Languedoc*, *Provence*, and *Dauphiné*, and all over the Banks of the *Rhone*, where it produces abundantly, and may be mowed five or six times in a Year. *Horses*, *Mules*, *Oxen*, and other domestic Cattle love it exceedingly, but above all when it is green, if they are permitted to feed on it, and especially the Black Cattle, which will

will feed very kindly upon the dry'd Plant; the Excess of which is by many People thought to be very dangerous: But it is said to be exceeding good for Milch Cattle, to promote their Quantity of Milk; and is also said to agree with Horses the best of all, tho' Shep, Goats, and most other Cattle will feed upon it.

The Directions given by all those who have wrote of this Plant, are very imperfect, and, generally, such as if practis'd in this Country, will be found intirely wrong; for most of them order the mixing of this Seed with *Oats* or *Barley*, (as is practis'd for *Clover*); but in this Way it seldom comes up well, and if it does, it will draw up so weak by growing amongst the Corn, as not to be recover'd under a whole Year, if ever it can be brought to its usual Strength again.

Others have directed it to be sown upon a low, rich, moist Soil, which is found to be the worst next to a Clay of any for this Plant; in both which the Roots will rot in Winter, and in a Year or two the whole Crop will be destroy'd.

But the Soil in which this Plant is found to succeed best in this Country, is a light, dry, loose, sandy Land, which should be well plough'd and dress'd, and the Roots of all noxious Weeds, such as *Couch-grass*, &c. destroy'd, otherwise these will overgrow the Plants while young, and prevent their Progress.

The best Time to sow the Seed is about the Beginning of *April*, when the Weather is settled and fair; for if you sow it when the Ground is very wet, or in a rainy Season, the Seeds will burst and come to nothing, (as is often the Case with several of the Leguminous Plants) therefore you should always observe to sow it in a dry Season; and if there happens some Rain in about a Week or ten Days after it is sown, the Plants will soon appear above-ground.

But the Method I would direct for the sowing these Seeds, is as follows: After having harrow'd the Ground very fine, you should make a Drill quite across the Ground about an Inch deep, into which the Seeds should be scatter'd very thin; then cover them over about half an Inch thick, or somewhat more with the Earth; then proceed to make another Drill about two Feet from the former, sowing the Seeds therein in the same manner as before, and so proceed through the whole Spot of Ground, allowing two Feet Distance between Row and Row, and scatter the Seeds very thin in the Drills. In this manner, an Acre of Land will require about six Pounds of Seeds; for when it is sown thicker, if the Seed grows well, the Plants will be so close as to spoil each other in a Year or two, the Heads of them growing to a considerable Size, as will also the Roots, provided they have Room. I have measur'd the Crown of one Root, which was in my Possession, eighteen Inches Diameter, from which I cut near four hundred Shoots at one time, which is an extraordinary Increase, and this upon a poor, dry, gravelly Soil, which had not been dung'd for many Years, but the

Root was at least ten Years old; so that if this Crop be well cultivated, it will continue many Years, and be equally as good as when it was first sown, for the Roots do generally run down very deep in the Ground, provided the Soil be dry; and although they should meet a hard Gravel a Foot below the Surface, yet their Roots would penetrate it and make their Way downward, as I have experienc'd, having taken up some of them which were above a Yard in Length, and had run above two Feet into a Rock of Gravel, which was so hard as not to be loosen'd without Mattocks and Crows of Iron, and that with much Difficulty.

The Reason for directing this Seed to be sown in Rows, is, that the Plants may have Room to grow; and for the better stirring the Ground between them, to destroy the Weeds, and encourage the Growth of the Plants, which may be very easily effected with a small Breast-Plough, just after the cutting the Crop each time, which will cause them to shoot again in a very little time, and be much stronger than in such Places where the Ground cannot be stirred: But you can't pretend to use a Plough the first Season amongst it, until the Plants have taken good Root in the Ground; therefore when they first come up, the Ground between should be hoed: And if in doing of this you cut up the Plants where they are too thick, it will cause the remaining to be much stronger. This Hoeing should be repeated two or three times while the Plants are young, according as the Weeds are produc'd, observing always to do it in dry Weather, that the Weeds may the better be destroy'd, for if it be done in moist Weather, they will root and grow again.

With this Management, the Plants will grow to the Height of two Feet or more by the Beginning of *August*, when the Flowers will begin to appear; at which time it should be cut, observing to do it in a dry Season, and keep it often turn'd, that it may soon dry, and be carry'd off the Ground, for if it lie long upon the Roots, it will prevent their shooting again: After the Crop is taken off, you should stir the Ground between the Rows with a Breast-Plough, to kill the Weeds and loosen the Surface, which will cause the Plants to shoot again in a short time, so that by the Beginning of *September*, there will be Shoots four or five Inches high; when you may turn in Sheep upon it to feed it down, for it will not be fit to cut again the same Season, nor should the Shoots be suffer'd to remain upon the Plants, which would decay when the frosty Weather comes on, and fall down upon the Crown of the Roots, and prevent their shooting early the succeeding *Spring*.

So that the best Way is to feed it until *November*, when it will have done shooting for that Season: But it should not be fed by large Cattle the first Year, because the Roots being young would be in danger of being destroy'd either by their trampling upon them, or their pulling them out of the Ground: But Sheep will be of Service to the Roots by dung-

ing the Ground, and they will not eat it too close, so as to endanger the Crown of the Roots.

The Beginning of *February*, the Ground between the Roots should be again stirred with the Plough, to encourage them to shoot again; but in doing of this, you should be careful not to injure the Crown of the Roots, upon which the Buds are at that time very turgid, and ready to push. With this Management, (if the Soil be warm) by the Beginning of *March* the Shoots will be five or six Inches high; when, if you are in want of Fodder, you may feed it down till a Week in *April*: After which it should be suffer'd to grow for a Crop, which will be fit to cut the Beginning of *June*; when you should observe to get it off the Ground as soon as possible, and stir the Ground again with the Plough, which will forward the Plants shooting again, so that by the Middle or latter End of *July* there will be another Crop fit to cut, which must be managed as before: After which, it should be fed down again in *Autumn*, and as the Roots by this time will have taken deep Hold in the Ground, so there will be little Danger of hurting them, if you should turn in larger Cattle; but you must always observe not to suffer them to remain after the Roots have done shooting, lest they should eat down the Crown of the Roots below the Buds, which would considerably damage, if not destroy them.

In this manner you may continue constantly to have two Crops to cut, and two Feedings upon this Plant; and in good Seasons there may be three Crops cut, and two Feedings, which will be a great Improvement, especially as this Plant will grow upon dry barren Soils, where Grass will come to little, and be of great Use in dry Summers when Grass is often burnt up. And as it is an early Plant in the *Spring*, so it will be of great Service when Fodder falls short at that Season; when it will be fit to feed at least a Month before Grass or Clover; for I have had this Plant eight Inches high by the tenth of *March*, at which time the Grass in the same Place has scarcely been one Inch high.

That the Cold will not injure this Plant, I am fully satisfy'd, for in the very cold Winter *Anno 1728*, I had some Roots of this Plant which were dug up in *October*, and laid upon the Ground in the open Air till the Beginning of *March*; when I planted them again, and they shot out very vigorously soon after, nay even while they lay upon the Ground, they struck out Fibres from the Underside of the Roots, and had begun to shoot green from the Crown of the Roots. But that Wet will destroy the Roots, I am fully convinc'd, for I sow'd a little of the Seed upon a moist Spot of Ground for a Trial, which came up very well, and flourish'd exceedingly during the Summer-season; but in Winter, when the great Rains fell, the Roots began to rot at Bottom, and before the Spring, were most of them destroy'd.

The best Places to procure the Seed from, are *Switzerland*, and the Northern Parts of *France*, which succeed better with us than

that which comes from a more Southern Climate; But this Seed may be sav'd in *England* in great Plenty; in order to which, a small Quantity of the Plants should be suffer'd to grow uncut till the Seeds are ripe; when it must be cut, and laid to dry in an open Barn where the Air may freely pass through, but the Seed must be defended from the Wet, for if it be expos'd thereto, it will shoot while it remains in the Pod, whereby it will be spoil'd: When it is quite dry, it must be thrash'd out and cleans'd from the Husk, and preserv'd in a dry Place till the Season for sowing it: And this Seed sav'd in *England* is much preferable to any brought from Abroad, as I have several times experienc'd; the Plants produc'd from it having been much stronger than those produc'd from *French*, *Helvetian*, or *Turkey* Seeds, which were sown at the same Time, and on the same Soil and Situation.

I am inclinable to think, that the Reason of this Plant not succeeding, when it has been sown in *England*, has either been occasion'd by the sowing it with Corn, with which it will by no means thrive; (for tho' the Plant be very hardy when grown pretty large, yet at its first coming up, if it be incommoded by any other Plants or Weeds, it seldom does well; therefore it should always be sown by itself, and carefully clear'd from Weeds until it has Strength, after which it is not easily destroy'd:) Or perhaps People have sown it at a wrong Season, or in wet Weather, whereby the Seeds have rotted and never come up, which hath discourag'd their attempting it again: But however the Success has been, I dare aver, that if the Method of sowing and managing of this Plant, which is here laid down, be duly follow'd, it will be found to thrive as well as any other Sort of Fodder now cultivated in *England*, and will continue much longer; for if the Ground be duly stirred between each Crop, and the last Crop fed, as hath been directed, the Plants will continue in Vigour twenty Years or more without renewing, provided they are not permitted to seed, which will weaken the Roots more than four times cutting it would do.

The Hay of this Plant should be kept in close Barns, it being too tender to be kept in Reeks open to the Air as other Hay; but it will remain good, if well dry'd before it be carry'd in, three Years. The People abroad reckon an Acre of this Fodder sufficient to keep three Horses all the Year round.

MEDICA COCHLEATA; Snail-Trefoil.

The Characters are;

These Plants differ from the former in the Fruit, which of these Kinds are shap'd like a Snail.

There are great Numbers of Sorts of this Plant which are preserv'd in Botanick Gardens for Variety; but I shall in this Place only mention two or three of the most curious Sorts, which are cultivated in Gardens for the Oddness of their Fruit.

The Species are;

1. MEDICA; *scutellata*. *J. B.* The Snail-Trefoil, commonly call'd in the Seed-shops Snails.

2. MEDICA;

2. *MEDICA*; *orbiculata*. *J. B.* Flat, round Snail-Trefoil.

3. *MEDICA*; *coccleata*, *spinosa*, *echinis magnis*, *utrinque turbinatis*, *cum spinulis reflexis*. *Raii Hist.* Prickly cochleated Medick, with a large Head turbinated on every Side with reflex'd Spines, commonly call'd, Horns and Hedge-hog.

4. *MEDICA*; *marina*. *Lob. Icon.* Sea Medick or Snail-Trefoil.

The two first Sorts are common in the *English* Gardens, their Seeds being frequently sold in the Seed-shops in *London*; but the third Sort is pretty rare at present in *England*.

These three Sorts may be propagated by sowing their Seeds upon a warm dry Border the Beginning of *April*, observing always to do it in dry Weather; for if the Ground be very wet, or there should happen much Rain soon after they are put into the Earth, it very often bursts and destroys the Seeds; but if some gentle Showers fall about a Week or ten Days after the Seeds are sown, it will bring up the Plants in a short Time after. When they are come up, they should be carefully clear'd from Weeds, and thinn'd out to about a Foot asunder or more, (for they must remain where they were sown, seldom succeeding when transplanted); and after this, they will require no farther Care but only to keep them clear from Weeds; and in *July* they will flower, and their Fruit will ripen in a short Time after: When the Plant is in full Beauty, the first Sort, at a small Distance, will appear as if it had a great Number of *Snails* upon it; and the third Sort, having large rough Heads, will make a very good Appearance: For which singular Oddness, a good Garden should always have a few Plants of each Sort, especially since they require very little Care to cultivate them.

When the Fruit is full ripe, it should be gather'd and laid by in a dry Place for the Seeds, for if they are permitted to remain upon the Plants, and there should Rain happen, the Seeds would sprout in the Heads, and be destroy'd.

The fourth Sort is a perennial Plant, which is preserv'd by such Persons as are very curious in collecting great Variety of odd Plants. This may be propagated by sowing the Seeds, as the former, or by planting Cuttings during any of the Summer-Months, which if water'd and shaded, will take Root in a short Time; after which, they must be planted in Pots fill'd with light sandy Earth, and shelter'd in Winter under a Hot-bed Frame, where they may have a great Share of free Air in mild Weather, and only require to be skreen'd from hard Frost. This Plant is preserv'd for the beautiful Whiteness of its Leaves, which when intermix'd with other low Plants, makes a pretty Variety.

MEDICAGO; Moon-Trefoil.

The Characters are;

It hath a papilionaceous Flower, out of whose Empalement arises the Pointal, which afterwards becomes a plain orbiculated Fruit, shap'd somewhat like a Half-Moon; in which are contain'd Kidney-shap'd Seeds.

The Species are;

1. *MEDICAGO*; *annua*, *trifolii facie*. *Tourn.* Annual Moon-Trefoil, with the Appearance of Trefoil.

2. *MEDICAGO*; *Vulnerariae facie*, *Hispanica*. *Tourn.* Spanish Moon-Trefoil, with the Appearance of *Vulneraria*.

3. *MEDICAGO*; *trifolia*, *frutescens*, *incana*. Shrubby Three-leav'd hoary Moon-Trefoil, by many suppos'd to be the true *Cytisus* of *Virgil*.

The two first Sorts are annual Plants, which are preserved in Botanick Gardens for Variety, more than any singular Beauty or Use: These may be propagated by sowing their Seeds in the Beginning of *April*, upon a Bed of light Earth, in the Places where they are to remain; for they seldom succeed when they are transplanted; and when they come up, they should be clear'd from Weeds, and thinn'd to the Distance of a Foot asunder; after which, they will require no farther Care, but only to keep them clear from Weeds, and in *July* they will flower, and their Seeds will be perfected in *August*. The Seed-vessels of these Plants being shap'd like Half-Moons, is the only remarkable Difference between them and the *Medica's*.

The third Sort grows to be a strong Shrub, and will rise to the Height of five or six Feet, and may be reduc'd to a regular Head, when it will appear very beautiful: But it should not be cut too often, which would prevent its Flowering; for if the Shoots are permitted to grow without much Trimming, they will produce Flowers most Parts of the Year, which, together with the Beauty of its Silver-colour'd Leaves, renders it worthy of a Place in every good Garden.

This Plant may be propagated by sowing the Seeds, either upon a moderate Hot-bed, or a warm Border of light Earth, in the Beginning of *April*; and when the Plants come up, they should be carefully clear'd from Weeds: But they should remain undisturb'd, if sown in the common Ground, 'till the *April* following; but if on a Hot-bed, they should be transplanted about *Midsummer* into Pots, placing them in the Shade until they have taken Root: After which, they may be remov'd into a Situation where they may be screen'd from strong Winds, in which they may abide 'till the Latter-end of *October*, when they must be put into a Frame, in order to shelter 'em from hard Frosts; for those Plants which have been brought up tenderly, will be liable to suffer by hard Frosts, especially while they are young. In *April* following these Plants may be shaken out of the Pots, and placed into the full Ground where they are design'd to remain, which should be in a light Soil, and a warm Situation, in which they will endure the Cold of our ordinary Winters extremely well, and continue to produce Flowers most part of the Year.

Those also which were sown in an open Border may be transplanted in the *April* following in the same Manner: But in doing of this, you must be careful to take 'em up with a

Ball

Ball of Earth to their Roots, if possible ; as also to water and shade 'em until they have taken Root ; after which, they will require little more Care than to keep 'em clear from Weeds, and to prune their Heads once a Year, *i. e.* About the Beginning of *July*, in order to reduce them to a regular Figure : But you should never prune them early in the *Spring*, nor late in the *Autumn* ; for if Frost should happen soon after they are pruned, it will destroy the tender Branches, and, many times, the whole Plant is lost thereby.

These Plants have been constantly preserv'd in the Green-house, supposing 'em very tender : But I have had large Plants of this Kind, which have remain'd in the open Air in a warm Situation many Years without any Cover, and have been much stronger, and flower'd better, than those which were hous'd : Though, indeed, it will be proper to keep a Plant or two in Shelter, lest, by a very severe Winter (which sometimes happens in *England*) the Plants abroad should be destroy'd.

They may also be propagated by Cuttings, which should be planted in *April*, upon a Bed of light Earth, and water'd and shaded until they have taken Root ; after which they may be expos'd to the open Air, but they should remain in the same Bed till the *April* following before they are transplanted ; by which Time they will have made strong Roots, and may be remov'd then with Safety to the Places where they are to remain, observing (as was before directed) to water and shade them until they have taken Root : After which you may train them up with strait Stems, by fastning them to Sticks, otherwise they are apt to grow crooked and irregular ; and when you have got their Stems to the Height you design them, they may then be reduc'd to globular Heads, and with pruning their irregular Shoots every Year, they may be kept in very good Order.

This Plant grows in great Plenty in the Kingdom of *Naples*, where the Goats feed upon it, with whose Milk the Inhabitants make great Quantities of Cheese : It also grows in the Islands of the *Archipelago*, where the *Turks* use the Wood of these Shrubs to make Handles to their Sabres ; and the *Calogers* of *Patmos* make their Beds of this Wood.

This is, as hath been before observ'd, by many People suppos'd to be the *Cytisus* of *Virgil*, *Columella*, and the old Writers in Husbandry, which they mention as an Extraordinary Plant, and worthy of Cultivation for Fodder ; from whence several Persons have recommended it as worth our Care in *England*. But however useful this Plant may be in *Crete*, *Sicily*, *Naples*, or those warmer Countries, yet I am persuad'd it will never thrive in *England*, so as to be of any real Advantage for that Purpose ; for in severe Frost it is very subject to be destroy'd, or at least so much damag'd as not to recover its former Verdure before the Middle or latter End of *May* ; and the Shoots which are produc'd, will not bear cutting above once in a Summer, and then will not be

of any considerable Length ; and the Stems growing very woody, will render the cutting of it very troublesome : So that upon the Whole, it can never answer the Trouble and Expence in cultivating it, nor is it worth the Trial, since we have so many other Plants preferable to it ; though in hot, dry, rocky Countries, where few other Plants will thrive, this may be cultivated to great Advantage, since in such Situations this Plant will live many Years, and thrive very well.

But however unfit this may be for such Uses in *England*, yet for the Beauty of its hoary Leaves, which will abide all the Year, together with its long Continuance in Flower, it deserves a Place in every good Garden, where being intermix'd with Shrubs of the same Growth, it makes a very agreeable Variety.

As there are at present so many Persons inquisitive to know which is the true *Cytisus* mention'd by the Antients, I have taken the Pains of transcribing briefly what they have said as to its Description ; by which may be judged how uncertain it is to determine in an Affair where there is so little to be found in Authors to assist us.

Theophrastus says, *Cytisus* is such an Enemy to other Plants, that it will kill them, by robbing them of Nourishment ; and that the Medulla of it is so hard and thick, that it comes the nearest of any thing to *Ebenum*.

The Shrub *Cytisus*, by *Aristomachus* the *Athenian*, as may be seen in *Pliny*, [who says much the same as *Varro* and *Columella*, from whom probably he has taken it] is highly commended for Food for Sheep, and being dry, for Swine : The Utility [as to Health and Fattening ; *Dal*] the same as that of *Ervum* ; but the Satiety is quicker, a four-footed Beatt growing fat with a little of it, so that Cattle set light by their Barley.

No Food makes a greater Quantity, nor better Milk, and it excels all Things as to the Diseases of Cattle : Moreover, being given dry, or in a Decoction of Water mix'd with Wine, to Nurses whose Milk fails, it helps very much, and makes the Children stronger, and take to their Feet sooner : Green, it is also good for them ; or dry, if it be made moist.

Democritus and *Aristomachus* say, Bees will never want Food if they have *Cytisus* enough, nor is any thing cheaper.

It is sown with Barley early in the *Spring*, or in *Autumn*.

If when the Seed be sown, Showers be wanting, *Columella* directs, That it be water'd the fifteen following Days.

It is sown [according to the Antients] after the *Equinoxes*. It is perfected in three Years. It is mown in the *Vernal Equinox*, [for it flourishes all the Winter ; *Dal*.] when it has done flowering, with the cheap Labour of a Boy or old Woman.

The *Cytisus* is hoary in Aspect : If any one would express its Likeness briefly, it is a Shrub of a broader Trefoil.

In Winter, being moisten'd, ten Pounds will satisfy a Horse, and a less Quantity other Animals.

imals. Being dry, it has more Virtue, and a less Quantity satisfies.

Garlick and Onions grow very well between the Rows.

This Shrub was found in the Isle *Cytnus*, thence it was translated into all the *Cyclades*, and afterwards into the Cities of *Greece*, where it occasioned a great Increase of Cheese.

It fears not the Injury of Heat nor cold, nor Hail nor Snow; and *Hyginus* adds, nor of Enemies, because the Wood is of no Value.

Also *Galen*, in his Book, *de Antid.* writes, "Cytisus is a Shrub. In *Myfia*, in that Part that is nearest to our Province, there is a Tract which they call *Brotton*, in which there is a Place full of *Cytisus*; from the Flowers of which, all agree, the Bees make very much Honey.

"It is a fruticose Plant. It rises to the Height of a *Myrtle*.

He says, Seven simple Leaves have the Faculty of Digesting, mix'd with warm Water, as the Leaves of *Mallows*. Thus *Galen*.

Basil Fab. in *Thef.* calling *Cytisus Wieflee* and *Spitslee*, like to the *Lotus*, and a Shrub grateful to the Goats, knows not what he writes.

Cornarus too securely writes, That *Cytisus* either never came among the *Germans*, or that it perish'd long ago. From what *Pliny* says, That it was very rare in *Italy* in his Time; he cannot persuade me, that nothing could grow in *Germany* that was scarce in *Italy*. *Jo. Baub.*

Strabo, contrary to *Dioscorides*, *Pliny*, and *Galen*, will have the *Cytisus* to be a Tree; and he likens it to the *Balsamum*, an odoriferous Tree; which probably was the Occasion that *Cornarus* thought this Tree came nearest to a Shrub, because *Pliny* said the Wood was of no Value; therefore he persuades himself, that it produces woody Branches, not tender and soft, as in an Herb.

But *Virgil* shews it is neither a Tree, nor a Shrub, when he says;

- - - - Non me pascente, capellæ

Buc. Eclog. 1.

Florentem Cytisum, & salices carpetis amaras,

Eclog. 9.

Sic Cytiso pastæ discentur ubera vaccæ,

Eclog. 10.

Nec Cytiso saturantur apes, nec fronde capellæ.

Virgil, I say, indicates very plainly in these Verses, that it is neither a Tree, nor a Shrub; for Goats do not use it, nor can they, if they were wont to eat flowery Trees. Neither will what *Cornarus* says, avail, when *Pliny* says the Wood is of no Value, that it must, of Necessity, produce woody Branches; nay, the contrary is rather true, that there is no Value in the Wood; that it bears viney, pliable Branches, with which the Goats cannot be satiated.

Theocritus very plainly expresses it, That *Cytisus* is a very grateful Food to Goats;

Ἡ αἵ τιν' κύνιστον, ὁ λύκος τὴν αἶγα διώκει.

Capra Cytisum, lupus capellam sequitur.

Amatus, to avoid this Difficulty, concludes *Cytisus* to be between Trees and Shrubs, by the Difference of Genus, to be distinguish'd by *Pliny*, that, as a Tree, it may be us'd in the Feminine Gender, as a Shrub, in the Masculine; which is not worth the minding.

Columella uses *Cytisus* in the Feminine Gender; and *Theocritus* and others in the Masculine; as *Rob. Const.* in *Lex.* who writes, it was call'd ἀρσουλων; and *Theocritus* calls this Shrub κυτίλον; and others, κυτίσων; others, κυτίλιν.

Of *Cytnus*, or, as others, of *Cytnisa*, the Name of an Island, as *Severius* has it.

Among these Words of *Dioscorides* in some Manuscripts, there are found, falsely written, in some *Telinen*, *Triphyllon*, in others *Latum Grandem*.

Dioscorides's Description of the *Cytisus*, is not so accurate, that, from it, the true *Cytisus* may be ascertain'd; from whence it has happen'd, that different Authors have exhibited different *Cytisus*.

The following Plants are denominated *Cytisus*'s by the Writers in Botany:

Cytisus filiqua incurva folio candicante, & Marantbe descripto.

Cytisus Clus. 1. folio virecente.

Cytisus montis calcaris.

Cytisus Hisp. Clus. 2.

Cytisus spicato flore.

Cytisus 3 Hisp. Clus. non brevi pediculo.

Cytisus hirsuta.

Cytisus Pann. Clus. omnia incana.

Cytisus 2 Pannow. Clus. species altera hirsuta valde.

Cytisus Pann. 3 Clus. sparsis ramis.

Cytisus Pannon. 3 Clus. species, altera supinis ramulis.

Cytisus filiqua angusta glabra.

Cytisus glabra lata filiqua.

Cytisi genus flore purpureo.

Cytisi facie alysson fruticans.

Altho', in this Multitude of *Cytisus*'s, it is hard to judge which is the legitimate *Cytisus* specify'd by the Antients; the most Skillful take it to be that which *Maranathus* has describ'd, which is our *Medicago*.

Besides these, there are also certain other Plants that bear the Name of *Cytisus*, which I have, for good Reasons, omitted from amongst the fore-mentioned.

Trifolium fruticans, according to *Dodonæus*, or *Polemonium*, according to some, is improperly call'd *Cytisus* by many.

Laburnum is call'd *Cytisus* by some.

Some have thought *Colutea*, as it is call'd by some, to be a *Cytisus*.

Colutea Scorpioides is near a kin to *Cytisus*, according to *Clusius*.

Camerarius thinks, *Dorycnium Monspeliensum*, as it is accounted, to be a-kin to the *Cytisus* of *Columella*.

Trifolium candidum *Dodon.* by some, is said to be the *Cytisus* of *Columella*; concerning which, see *lib. Hist. n. 9. 17.* of *Trifolious Herbs*.

Some will have the *Cytisus* of *Marcellus Empiricus*, and also of *Dioscorides*, *Columella* and *Virgil*, to be a certain great *Trefoil*.

Tragus writes, That their Opinion is to be rejected, who interpret the *Trifolium Pratense* to be a *Cytisus*.

Some contend, That the *Trifolium Candidum* of *Dodon.* the *Reltū Melilotum Vulgare* to be the *Cytisus* of the Antients, as *Dodonæus* says; but they have not hit on the Truth.

Ruellius writes, That he was afraid, that *Marcellus* took *Cytisus* for *Medica*.

The *Lotus Sativa Odorata* is by some thought to be the *Cytisus*, but others do not approve of it.

MEDLAR; *vide* *Mespilus*.

MELAMPYRUM; [*Μελάμυρον*, of *μέλας* Black, and *πυρὸς* Wheat.] Cow-Wheat.

The Characters are;

The Leaves grow opposite by Pairs: The Flower consists of one Leaf, is of an anomalous personated Figure, and divided into two Lips; the uppermost of which has a Spur, but the under one is intire: The Fruit is round, and divided into two Cells, containing Seeds resembling Grains of Wheat.

The Species are;

1. MELAMPYRUM; *luteum, latifolium*. C.B.P. Yellow broad-leav'd Cow-Wheat.

2. MELAMPYRUM; *luteum, angustifolium*. C.B.P. Narrow-leav'd Yellow Cow-Wheat.

3. MELAMPYRUM; *Coma purpurascens*. C.B.P. Cow-Wheat, with purplish Tops.

The two first Sorts are very common in Woods and shady Places, growing near the Foot of Trees in divers Parts of England, and are never cultivated in Gardens.

The third Sort is very rarely found wild in England; but, in *West-Friesland* and *Flanders* it grows very plentifully among the Corn, and *Clusius* says, it spoils their Bread, making it dark, and that those who eat of it, us'd to be troubled with Heaviness of the Head, in the same manner as if they had eaten *Darnel* or *Cockle*; but *Mr. Ray* says, He has eat of this Bread very often, but could never perceive that it gave any disagreeable Taste, or that it was accounted unwholesome by the Country People, who never endeavour to separate it from the Corn; and *Tabernemontanus* declares, He has often eaten it without any Harm, and says, it makes a very pleasant Bread. It is a delicious Food for Cattle, particularly for fattening of Oxen and Cows: For which Purpose it may be cultivated in the same manner as hath been directed for the *Fagopyrum* or *Buck-Wheat*: It loves a light sandy Soil.

MELIANTHUS; [*Μελιάνθος*, of *μέλι* Honey, and *άνθος* a Flower.] Honey-Flower.

The Characters are;

It hath a perennial Root, and the Appearance of a Shrub: The Leaves are like those of Burnet: The Cup of the Flower is divided into several Parts: The Flower consists of four Leaves, and is of an anomalous Figure: The Petals (or Leaves) are plac'd sometimes in the Shape of a Fan, and at other times are of a conical Figure: The Ovary becomes a Fruit resembling a Bladder four corner'd, divided into four Cells, and pregnant with roundish Seeds.

The Species are;

1. MELIANTHUS; *Africanus* H L. The large Honey-flower, vulgarly call'd, The Locus or Wild Honey.

2. MELIANTHUS; *Africanus, minor, fætidus*. Com. Rar. The smaller stinking Honey-flower.

The first of these Plants is pretty common in many English Gardens, where it is preserv'd as a Curiosity. This produces large Spikes of Chocolate-colour'd Flowers in May; in each of which is contain'd a large Quantity of a black sweet Liquor, from whence it is suppos'd to derive its Name.

This Plant was formerly preserv'd in Green-houses as a tender Exotick; but, if planted in a dry Soil, and a warm Situation, will endure the Cold of our ordinary Winters very well; and if, in a severe Frost, the Tops of them should be destroyed, yet the Roots will abide, and put forth again the succeeding Spring, so that there is no great Danger of losing it; and the Plants which grow in the open Air, do always flower much better than those which are preserv'd in the Green-house, as being less drawn, which always is hurtful to the Flowering of Plants, and many times prevents their producing any Flowers.

This Plant may be propagated by taking off its Suckers or Side-shoots any Time from March to September, observing to chuse such as are furnish'd with Fibres; and after they are planted, you must water, and shade them, until they have taken Root, after which they will require no farther Care but to keep them clear from Weeds: They may also be propagated by planting Cuttings, during any of the Summer Months; which, if water'd and shaded, will take Root very well, and may afterwards be transplanted where they are design'd to remain.

The second Sort is less common than the former, and only to be found in some curious Collections of Plants, tho' it seems to be equally as hardy as the former. This produces lesser Spikes of Flowers, but they are much more beautiful than the former, their Flowers having a Mixture of Red, Green and Yellow. This produces its Flowers in May, and sometimes perfects its Seeds with us, by which it may be propagated: And the Plants obtain'd from such Seeds, would be hardier than those which come from Abroad, or are rais'd from Slips. This may be propagated in the same Manner as the former, and requires much the same Culture, though it is commonly preserv'd in the Green-house; but I have seen Plants of this Kind which were growing in the Gardens of *Charles du Bois Esq;* at *Mitcham* in *Surrey*, under a warm Wall, which produc'd a greater Quantity of Flowers, and ripened their Seeds better than any of those Plants which are preserv'd in the Green-house. This Sort commonly grows to a greater Height than the former, and its Branches become more woody.

MELILOTUS; [*Μελιλότος*, of *μέλι* Honey, and *Lotus* the Lote-tree, which was a celebrated Plant among the Antients: It was call'd the Honey

Honey Lotus, because Bees do not collect more and sweeter *Honey* from any Herb than from this Plant; but it is not so call'd on account of its Taste, for the Leaves, Flowers, and Fruit of it are bitter.] *Melilot*.

The Characters are;

It hath a *papilionaceous Flower*; out of whose *Empalement* arises the *Pointal*, which afterwards becomes a naked *Capsule*, that is not hid in the *Empalement*, (as in *Trefoil*) pregnant with one or two roundish *Seeds*: To these Notes may be added, the Leaves grow by *Threes* on the *Footstalks*, and the Flowers are produc'd in a *Spike*.

The Species are;

1. MELILOTUS; officinarum, Germanica, C. B. P. Common *Melilot*.
2. MELILOTUS; fruticosa, candida, major, Mor. Hist. Shrubby *Melilot*, with a white Flower.
3. MELILOTUS; major, odorata, violacea. Mor. Hist. Greater sweet-scented *Melilot*, with a Violet-colour'd Flower, commonly call'd Sweet *Trefoil*, or *Lotus Urbana*.

There are several Species of this Plant, which are preserv'd in curious Botanick Gardens for Variety; but as they are Plants of little Beauty or Use, so I shall pass them over without naming. The first Sort here mention'd, is that used to make the *Melilot Plaister*: This is found wild in several Parts of *England*, but is generally cultivated in some Gardens near *London*, from whence the Markets are supply'd with it. The second Sort is by some suppos'd to be only a Variety of the first, differing in the Colour of its Flowers; but this is a Mistake, for the whole Plant has a very different Appearance, the Leaves being narrower, the Stalks much taller, nor has it near so strong a Scent. The third Sort is sometimes used in Medicine, but is rarely cultivated except in Botanick Gardens.

These may be all cultivated by sowing their Seeds in *March*, upon a Bed of light Earth; and when the Plants are come up, they should either be transplanted out, or hoed, so as to leave 'em eight or ten Inches asunder, (especially the two first Sorts, which will abide two or three Years, and grow very large) observing to keep them clear from Weeds, and the *August* following they will flower; when they may be cut for Use, which will cause them to push out new Shoots, whereby the Roots will be maintain'd through the Winter, and flower in *May* or the Beginning of *June* the succeeding Year. The cutting off the Shoots when the Plant is in flower, will maintain the Roots much longer than if they were permitted to stand till the Seeds are ripe, so that those Roots you intend for Seeds, must not be depended on to stand very long.

The third Sort is an annual Plant, which may be sown as the two former, but should not be transplanted, but rather hoed out to the Distance of five or six Inches, and permitted to remain in the same Place, observing to keep them clear from Weeds, and they will flower in *June*, and their Seeds will be ripe in *August*.

MELISSA; [so call'd of μέλι, *Honey*, because in making *Honey* you procure it from this Plant: It is also call'd *Melissophyllon*, of μέλι, and φύλλον, a *Leaf*, q. d. *Honey-leaf*: It is also call'd *Apiastrum*, of *Apis*, Lat. a *Bee*, because Bees are delighted with this Plant.] *Baulm*.

The Characters are;

It is a verticillate Plant, with a labiated Flower, consisting of one Leaf, whose Upper-lip is roundish, upright, and divided into two; but the Under-lip is cut into three Parts: Out of the Flower-cup rises the Pointal, which is attended, as it were, with four Embryo's: these afterwards turn to so many Seeds, which are roundish, and inclos'd in the Flower-cup. To these Notes may be added, the Flowers are produc'd from the Wings of the Leaves, but are not worked quite round the Stalks.

The Species are;

1. MELISSA; hortensis. C. B. P. Garden *Baulm*.
2. MELISSA; hortensis, foliis ex luteo variegatis. Garden *Baulm*, with yellow variegated Leaves.
2. MELISSA; Romana, molliter hirsuta, & graveolens. H. R. Par. Stinking Roman *Baulm*, with softer hairy Leaves.

There are some other Species of this Plant which are preserv'd in curious Gardens for Variety; but as they are never cultivated for Use, so I shall pass them by without naming.

The first of these Sorts is cultivated in Gardens for Medicinal and Culinary Use: This is propagated by parting the Roots, either in *Spring* or *Autumn*, planting the Slips at about eight or ten Inches Distance, in Beds about four Feet wide, leaving a Path two Feet between the Beds, for the Conveniency of cleaning, watering, and cutting the Plants.

When they are first planted, if the Season proves dry, you must carefully water them until they have taken Root, otherwise they will be subject to decay, but afterwards they will require no farther Care, but only to keep them clear from Weeds. These Plants should be transplanted and parted every other Year, otherwise their Roots will grow so large as to injure each other, and for want of Room will rot and decay.

The variegated Sort makes a very pretty Appearance in the *Spring* Season, while the Leaves are young, but afterwards their Beauty goes off; however, a few Plants of this Sort may be planted in large Borders for Variety.

The third Sort is a Plant of no great Beauty or Use, but is preserv'd in several curious Gardens for Variety. This is somewhat tender, and should have a dry Soil and a warm Situation, otherwise it is sometimes destroy'd in severe Frosts.

The two first Sorts will grow in almost any Soil or Situation; but the strip'd Sort should not have a rank Soil, which would cause it to grow vigorously, whereby the Beauty of its variegated Leaves soon goes off.

MELISSA TURCCIA; vide *Moldavica*.

MELO, [takes its Name of μήλον an *Apple*, because the Fruit resembles an *Apple*: The
Italians

Italians call it Milo, as tho' of Mille, Lat. a Thousand, because scarce one of a thousand is found to be good.] A Melon.

The Characters are

The Flower consists of one Leaf, which is of the expanded Bell-shape, cut into several Segments, and exactly like those of the Cucumber: Some of these Flowers are barren, not adhering to the Embryo; others are fruitful, growing upon the Embryo, which is afterwards chang'd into a Fruit, for the most part of an Oval-shape, smooth or wrinkled, and divided into three seminal Apartments, which seem to be cut into two Parts, and contain many oblong Seeds.

The Species are;

1. MELO; *vulgaris*. C. B. P. Common Musk Melon.

2. MELO; *rotundus, parvus*. C. B. P. Small round Musk Melon, commonly call'd, The Portuguese or Pocket Melon.

3. MELO; *reticulatis*. J. B. Netted or wrought Melon.

4. MELO; *magnus, cortice virente, semine parvo*. J. B. Greater Musk Melon, with a smooth green Skin, and a small Seed.

5. MELO; *Hispanicus, cortice albâ, intus rubente*. White Spanish Melon; *vulgô*.

6. MELO; *cortice lævi, intus virente*. The Green-flesh'd Melon; *vulgô*.

There are several other Varieties of Melons which are annually brought into England; but as many of them are only accidental Variations, and seldom continue to produce the same Kinds into Seed again, so it would be to little Purpose to enumerate them in this Place.

As there is not any Plant cultivated in the Kitchen-Garden, which the Gardeners near London have a greater Ambition to produce early and in plenty; so there is a great Number of Methods now practis'd in the raising and dressing of the Vines, in order to obtain them in greater Perfection: But to enumerate them all in this Place, would greatly exceed my intended Bounds, therefore I shall only set down the plain and easy Method, whereby a Person may depend on having a good Crop of Melons whenever the Season is tolerably good for them, provided the Seed be good, and the Directions duly follow'd.

And first, as to the Choice of Seed: In this you must be careful, because the whole Success of your Labour and Expence depends upon it. You should annually (if possible) exchange your Seeds, and not continue to save and sow the same for several Years in the same Ground, for they will certainly degenerate in two or three Years, and from being extraordinary good Sorts, will become very bad; therefore you should purchase some good Melons from some Gardens at a great Distance from you; which Seed (provided the Fruit was well-tasted, high-colour'd, and of a firm Nature) should be carefully preserv'd two or three Years before it be sown; when it will not so be subject to produce strong luxuriant Vines, but will be more productive of Fruit, (for as I have observ'd, that by keeping these Seeds, they annually lose of their Weight; so it is certain, that the watery Parts do first

evaporate; and these are what promotes Luxuriancy in all Plants, therefore the more of these are lost by keeping, &c. the more fruitful will the Plants be): but it must be observ'd, that although these Seeds will retain their growing Quality for eight or ten Years, yet they are not near so good at that Age (whatever may have been said to the contrary); for the Plants produc'd from such Seeds are generally too weak to produce Fruit of any considerable Size, and Seed of three or four Years old is by the best Judges always prefer'd.

But if you cannot obtain Seeds of that Age, and are oblig'd to sow new ones, then you should either carry it in your Breeches Pocket, where it may be kept warm, or plac'd at a proper Distance from a Fire two Months before it be sown; by which means the watry Parts will be carry'd off, and the Seed prove equally as good as if it had been kept two or three Years, as hath been experienc'd by several curious Persons.

There are commonly great Quantities of Melon Seed brought into England annually as great Curiosities, which often tempts the Gardeners to sow it, expecting something very extraordinary from it; but it seldom happens that it ever proves good, therefore great Care should be taken to know from whence it comes; by which may be gather'd how proper it is for our Climate, and also some Judgment made of the Goodness of the Sorts: For those Melons which are produc'd in the *West-Indies*, are generally very large, and being brought from a very hot Country, seldom come to any thing in England; and those Seeds which come from *Spain, Italy, or the Levant*, are seldom good for much, the Gardeners in those Countries being very careless in saving their Seeds: But the best Country to procure Melon Seeds from, is *Languedoc* in the South of France, where the Gardeners emulate each other in producing the finest Melons, and the Seeds brought from thence are much preferable to any sav'd in England, and do succeed better than those brought from most other Countries.

Having thus largely treated of the Choice of Seeds, I shall now proceed to the Method and Times of sowing them; which, according to the common Practice of the Gardeners near London, is at two Seasons; *viz.* The first (which is for the early Crop, to be planted under Frames) in the latter end of *January*, or the Beginning of *February*; tho' indeed there are some who, endeavouring to produce early Fruit, sow their Seeds in *December*, but then there must be a great Expence and Care, otherwise they will come to nothing: So that the most certain Season is that before mention'd; for if by great Care the Plants which are rais'd sooner are preserv'd in Health, yet when the Fruit first appears, if the Beds are not in good Temper for Heat, and great Care be not taken in giving them a just Proportion of Air, the Fruit will fall off and come to nothing. The second Season for sowing this Seed (which is for Bell or Hand-Glasses) is about the Beginning of *March*, or a little later, according

to the Earliness or Lateness of the Season; and is the general Crop of *Melons* which are commonly ripe in *July* or *August*: But I shall first begin with Directions for Raising and Managing the early Crop for Frames.

About seven or eight Days before you intend to sow the Seeds, you must prepare a Parcel of new Horse-Dung from the Stable, which should be cast up (together with the Litter) into a round Heap, mixing therewith a few Sea-Coal Ashes, which will help to preserve the Heat of the Dung. After it has lain in the Heap a Week, it will have acquir'd Heat enough for the Purpose: You must therefore dig a Trench the Length and Width of the Frame you intend for the Bed, and about a Foot deep, (provided the Ground be dry, but if it be wet, the Trench should not be above three or four Inches deep); into this Trench you must lay the Dung, observing to shake and work it well with the Fork, so that every Part of it may be equally stirr'd, whereby it will settle all alike; and it should be beaten down with the Fork, to prevent the Heat from going off too soon: This Dung should be laid three Feet thick; and after having made it exactly level on the Top, you should lay some fine light Earth thereon, about three Inches thick, on which the Seeds should be sown two Days after the Bed is made, covering it about half an Inch with the same light Earth. If after the Seed be sown, the Bed should prove very hot, you must raise the Light with a Stone about an Inch high, which will make Way for the Steam of the Bed to pass off: But if it should prove cool, you must lay some Litter about the Sides, and cover the Glass well with Mats or Straw every Night, and in bad Weather, which will soon bring it to a Heat. In about five Days after the Seed is sown, the Plants will appear above-ground; when you must carefully give them Air, to prevent their being suffocated by the Steam of the Bed, as also turn the Light every Day, when the Weather is fair, to dry off the Damp which settles upon the Glass; and if the Weather should not admit of the Light lying the wrong Side upwards to dry, then you must only turn it, and wipe off all the Moisture with a woollen-Cloth, and turn the Light again; for if the Moisture which is collected upon the Underside of the Glass be suffer'd to fall upon the Plants, it will occasion their changing yellow, and cause them to be very weak; for this proceeds from the Steam of the Dung and Earth, and the Perspiration of the Plants, which being confin'd and mix'd together, becomes of a rancid Nature, and so proves destructive to whatever Plants it lodges upon, or that imbibe any Part of it.

You should also, so soon as the Plants appear, cast up a fresh Heap of new Dung, as before; and after having lain in the Heap about six Days, you must make a new Bed in the Manner before directed, covering the Dung three Inches thick with good fresh light Earth; then put on the Frame and Glasses, and let it remain two or three Days for the great Heat to pass off before you set the Plants therein, that the

Bed may be of a moderate Temper, otherwise the Roots of the Plants will burn: When you find your Bed of a proper Temper for Heat, which you may easily know, by thrusting your Finger down in the Earth, letting it remain a small time, and if you feel no violent Heat, then you may be sure there will be no Danger of injuring them thereby: Therefore you should take up the Plants carefully out of the Seed-bed, (raising them with your Finger, that the Roots may not be injur'd) and prick them into the new Bed, about three Inches Distance each Way, covering the Glasses with Mats, if the Sun should be warm, till they have taken Root, after which you must be very careful to give them Air in Proportion to the Heat of the Bed, otherwise they will draw up very weak, and change yellow: You must also, as the Stems of the Plants advance in Height, put in some dry fresh Earth between them, to earth the Shanks, which will greatly increase their Strength; and be very careful to wipe the Moisture off from the Glasses, as was before directed, for the Reasons already laid down; and proportion your Covering of Mats every Night to the Heat of the Bed.

In about a Fortnight after the Plants are prick'd out, they will begin to shew the third (or what, in the Gardeners Language, is call'd the rough) Leaf; at which time you must be provided with a fresh Parcel of new Dung in Proportion to the Quantity of Lights you intend to plant, allowing a full Load (which commonly contains fourteen good Wheelbarrows) to each Light: When the Dung has lain in the Heaps six or eight Days, you must dig out a Trench in Proportion to the Length and Breadth of your Frames, and about a Foot deep, if the Soil be dry, but if wet, four or five Inches will be sufficient: Then wheel the Dung therein, observing to shake and work it equally in every Part of the Bed, that the Heat may be equal; and after having laid it even and level, you should lay on the Earth (observing to break it very fine) about three Inches thick, laying it exactly even; then put on the Frames, and in the Middle of each Light, where the Plants are to be planted, you should put a good Basket full of fresh, light, rich Earth, raising it into a little Hill; then cover the Beds with the Lights, letting it remain two or three Days, till you perceive it is of a proper Temper for Heat; when you must take the Plants carefully out of the former Bed, and after having levell'd the Hills in the Middle of each Light on the Top, and made it a little hollow, to contain a small Quantity of Water, you should set two strong Plants into each, observing to give them a little Water if the Earth be dry, as also to shade them from the Sun until they have taken Root; after which you must be careful to give them Air, according to the Proportion of the Heat of the Bed, as also to turn the Glasses to dry them: And when the Plants have put out the fourth Leaf, (which is what the Gardeners term having two Joints) you should pinch off the extreme Part of the Shoot, in order to force out lateral Branches or Runners; which

when they have produc'd about six Inches long, should be regularly plac'd in the Manner they are design'd to remain, for these Shoots ought never to be displac'd, or the Leaves bruise'd with the Hand, which is very injurious to them; therefore you should constantly keep them clear from Weeds, and as the Shoots are produc'd, lay them in their true Order so as not to cross or entangle with each other, but by no means should you stop them, as is too often practis'd, which occasions their putting forth a greater Number of Shoots, but then they are the weaker, and so there is a Confusion of Vine, but those not strong enough to produce any considerable Fruit, nor will the first *Melons*, which appear upon such Vines, remain, but, on the contrary, fall away, and come to nothing.

These Plants should be often refresh'd with Water, but you must be careful not to give them too much; and when the Vines have grown off from the little Hill upon which they were planted, you should water them gently all over their Leaves, which will greatly refresh them, but you should be careful not to do this in the Heat of the Day, lest the Sun, by immediately exhausting the Moisture, should scorch the Leaves of the Plants; nor should it be done late in the Evening, for the Glasses being then put down close, and cover'd with Mats or Straw, the Moisture which always arises after such Waterings, where there is a Warmth in the Beds, being pent in, will become rancid, and mixing with the Air, will occasion its being hurtful to the Plants, therefore the best time is about seven or eight of the Clock in the Morning, according to the Season of the Year; and when you find the Sun shines hot upon the Glasses, you should raise them, to let the Steam pass off, and in the Middle of the Day, in very hot Weather, the Glasses should be shaded with Mats or Straw, which will prevent their scorching, and preserve a gentle Moisture in the Bed, which is absolutely necessary for the Growth of Plants.

When your Fruit begins to appear, you will at the same time perceive a great Number of Male Flowers (which the Gardeners call false Blossoms, and are easily distinguish'd from the fruitful ones, by their being produc'd upon a slender Pedicle, whereas the fruitful ones are always fasten'd to the Top of the young Fruit): These are by many Persons carefully pick'd off, as supposing that they weaken the Plants, and are injurious to the young Fruit; but this is a very great Mistake, (as I have more than once experienc'd) for they are absolutely necessary to impregnate the Ovary of the fruitful Flower: Which when done, the Fruit will soon swell and grow large; but if this be obstructed, they seldom come to any thing, but on the contrary, change yellow, and fall off: Therefore I would caution every one against the nice pruning of *Melons*, in which they are so liable to commit Mistakes; whereas on the contrary, when they never do any thing more but only stop the first leading Shoots, to encourage their producing strong Runners, there is

no Danger of miscarrying, if the Vines are but kept clear from Weeds, and not tumbled or bruised, but carefully attended with Water, &c. then the natural Growth of the Plants not being obstructed, you need not fear Success.

During the Growth of the *Melons* you should constantly attend them with Water, being cautious not to give them too much; but when the Fruit is arriv'd to a considerable Bigness, you should intirely forbear watering them, or at least do it very sparingly, for the Water which is then given them, does but contribute to the making them large and ill-tasted, which should always be avoided, for a middle-siz'd well-tasted Fruit is far preferable to the most monstrous, watery, green, ill-tasted *Melon* that was ever produc'd.

When the Fruit begins to ripen, (which you may know by the changing its Colour, and emitting an Odour when closely smell'd to) you should turn it every Day, that every Side of the *Melon* may be expos'd to the Sun, that it may be equally ripen'd on all Sides: And if you intend to eat it soon after it is gather'd, you should let it remain upon the Vines until it changes pretty yellow, and the Stalks seem to separate from the Fruit; then you should cut it off in the Morning before the Sun is too hot, observing to preserve two Inches of the Stalk to the Fruit, otherwise it will lose of its Richness: But when the Fruit is to be sent to any Distance, so that it will be two or three Days before it is eaten, then you must observe not to let it be too ripe before it be cut, for it will be little worth, after being kept two or three Days.

If the above-mention'd Directions be duly observ'd, you will not have Occasion to pull off the Leaves from the Vines, to admit the Sun to the Fruit, as is often practis'd, though very absurdly, for the Fruit will always thrive much better where it has a gentle Coverture of Leaves, than where it is too much expos'd to the Sun, which hardens the outer Skin, and prevents its kindly Growth, whereby it is render'd tough and ill-tasted.

But notwithstanding I have advis'd the planting out the *Melon* Plants upon the Hills in the Middle of each Light, yet if any Person is very curious to have early Fruit, the best Method is to plant them in Baskets, (in the Manner as was directed for *Cucumbers*, under which Head you will find proper Instructions how they are to be manag'd until they are ridged out into the Frames for good, which should not be done till the Flowers begin to appear); after which the Management must be the same as hath been before inserted, both as to Pruning, Watering, &c. therefore I shall forbear repeating either of those Articles in this Place, but shall now proceed to the Method practis'd by the most skilful Gardeners, for the second or general Crop of *Melons* which are rais'd commonly under Bell or Hand-Glasses.

The Season for sowing the Seed for this Crop, is (as I before-mention'd) about the Beginning of *March*, and may be put into the Upper-side of the Hot-beds where your early *Melons*

Melons or *Cucumbers* are planted, in which Place they will soon come up, and may then be taken up and transplanted into a new Hot-bed, and cover'd either with Hand-glasses or Frames, (according as you have Conveniency) observing to refresh 'em with Water, as also to shade them, until they have taken Root; after which, you must let 'em have a great Share of fresh Air when the Weather is good, that the Plants may grow short and strong; and observe to earth up their Stems, as they advance, with light Earth, which will greatly encourage the Plants.

About the Beginning of *April* the Plants will put out their rough Leaves, at which Time you should be provided with a Quantity of new Dung, in Proportion to the Number of Holes intended, (always allowing a good Load of Dung to five Holes, which is the common *Quantum*) which should be cast into a Heap for six or seven Days, mixing therewith a few Sea-coal Ashes; and when the Dung is in a proper Temper for using, you must dig out a Trench, the Length whereof should be according to the Number of Glasses you intend in each Row, allowing them three Feet Distance, and in Width two Feet and an Half: But the Depth must be proportion'd to the Moisture or Driness of the Soil; in a dry one it should be ten Inches deep, but in a moist Soil two or three Inches will be enough; then you must wheel the Dung therein, observing to shake and work every Part of it equally, and to lay it of an equal Thickness, as also to make the Sides strait: Then having laid the Dung even, you must mark out the Places intended for the Holes, at each of which you must lay a Basket full of fresh light rich Earth, thrusting in a Stick about two Feet long into the Middle, which must remain for a Mark where the Hole is to be made; then cover the Dung all over, both Top and Sides, with the Earth that came out of the Trench, laying it exactly smooth and even, about three Inches thick, or somewhat more: Then put the Glasses on over each Stick, letting 'em remain close down two Days, by which Time the Dung will have warm'd the Earth sufficiently to receive the Plants: You should therefore draw out the Sticks, and with your Hand level the Top of the Hill, breaking the Clods, and laying it hollow like a Dish, to retain the Water given to them; then take the Plants up carefully from the other Bed, and put two strong ones into each Hole, observing to water and shade 'em until they have taken Root.

Thus having made one Ridge, you may continue to make as many more as you have Glasses for, allowing six Feet between each Ridge for a Path to go between them; which, at the first making the Ridges, may seem a great deal, yet after the Vines have run, and the Sides of the Ridges made up to support 'em, there will not be above two Feet left for a Path, which is as little as can well be allow'd.

Your Plants having made new Roots, and put out a fourth Leaf, you should nip off

the Top of each, to force out Runners from the Bottom, (as was before directed for those in Frames); and as the Weather increases warm, so you should always raise up the Glasses on the South-side with Stones, in the Middle of the Day, to give 'em Air, which will cause 'em to be very strong; and also give them a little Water twice a Week, if the Weather be good; but don't give 'em too much at each Time, lest you thereby canker and rot their Roots.

About the Middle of *May*, or sooner, (according as your Plants have thriven) their Runners will have grown so as to crush against the Glasses on every Side; therefore you should place three Bricks under each Glass at Right Angles, upon which the Glasses should be set, so that there may be a Hollow under each of about two Inches, or less, which will be sufficient to admit the Runners out; then you should gently lead them from under the Glasses, putting each in its right Position, so that they may not cross or intangle with each other; to prevent which, you should have some small forked Sticks, (such as are commonly used in laying *Carnations*) with which you should gently peg down each strong Runner, which will prevent their being displac'd by the Wind, or any other Accident. But you must observe, if the Nights prove cold after they are let out from under the Glasses, to cover 'em with Mats; otherwise the Ends of the Shoots will suffer by the Cold, to the no small Injury of the Plants: You must also observe to refresh 'em with Water, (as before); but forbear all other pruning or handling them, for the Reasons before laid down.

When the Vines have extended themselves to the Sides of the Ridges, you should dig up the Ground on each Side about two Feet wide, laying therein some old rotten Horse-dung, covering it with the Earth, so as to raise it even with the Top of the Ridges, whereby they will be widened near four Feet; and so the Vines will have Room to run on each Side, without hanging down from the Ridges; and the old Dung which was laid on each Side will be of great Service to the Roots. After having made up the Ridges in this manner, you must gently lay out the Shoots thereon, being careful to train 'em in their proper Order, so as not to cross each other: You must also carefully clear 'em from Weeds; but be very careful that you do not bruise or break the Leaves with your Hands; and then set the Glasses on again over the Roots, where they may remain unremov'd during the Continuance of the Plants: For after this, all the Water which is given to 'em must be gently sprinkled all over the Plants; and it's no matter whether any of it falls close to the Stems: But, on the contrary, the drier they are preserv'd, the greater Vigour they will have; for the Roots, which are the chief Support of 'em, are at this Time at a much greater Distance from the Hole, and will receive the Benefit of the Water much better, when given all over the Top of the Ridges.

When

When your *Melons* begin to appear upon the Vines, if the Season should be very hot and dry, you should pour down the Water in the Paths between the Ridges, which will soak in and supply the Roots with Moisture; and at that Season, the Water which is given all over the Plants should be but little, and given to them very gently, lest by the Violence of the Water you injure the tender Fruit: But after they are grown as large as your Thumb, they will be almost out of Danger, tho' then it will be adviseable to give them but gentle Refreshings over the Vines; but this may be repeated two or three times a Week, according to the Heat of the Season, observing always to do it in the Evening, that it may have time to soak in before the Sun comes on to exhale the Moisture. As to the pruning of them, I would (as I before said) advise never to be busy in that, since the more exact you are in that, the more likely you are to do hurt, therefore you need do no more than only keep the Vines clear from Weeds, and train them in regular Order.

When the Fruit is about the Bigness of a Tennis-Ball, you should place a thin Piece of Tile under each, to raise them from the Ground, otherwise they are very apt to rot, (especially if the Season should prove moist) or at least to receive Damage on the Under-side; and when the *Melons* are full grown, you should forbear watering them; and if the Weather be cold, you should place Glasses over them, which will greatly accelerate their Ripening, and cause 'em to be better tasted: You should also turn the Fruit two or three times as it is ripening, that every Part may be equally ripened; and in cutting them, you should observe the Directions before laid down.

In saving the Seeds, you should be careful to take them from such Fruit as are well ripened, of a firm Flesh, and well-tasted, suffering it to lie in the Pulp spread upon a Paper four or five Days before it be wash'd out; then you must dry it, and put it up for Use, always observing to title each Sort, and add the Year it was sowed.

The best Sorts for Frames, are the *Black Galloway*, and the *Small Portugal Melons*, which ripen early, and do not produce so strong Vines as the larger Sorts, which require more Room than can be allow'd them in Frames.

MELOCACTUS; [so call'd of *Μήλον* a Melon, and *Κάκτος* a Thistle, because it resembles a Melon; and it is also call'd *Echinomelocactus*, because it resembles a Hedge-hog by its Prickles.] Melon-Thistle.

The Characters are;

The whole Plant hath a singular Appearance, is very succulent, and hath many Angles, which are beset with sharp Thorns; the Flower consists of one Leaf, is tubulose and Bell-shap'd, divided into several Parts at the Top, and hath many Stamina or Threads; the Ovary becomes a soft fleshy Fruit, containing many small Seeds.

The Species are;

1. **MELOCACTUS**; *India Occidentalis*. C.B.P. The common or large Melon-Thistle,

commonly call'd Turk-Cap or Pope's-Head in the *West-Indies*.

2. **MELOCACTUS**; *Americana, minor*. Boerb. Ind. The lesser Melon-Thistle, or small Turk's-Head.

There are several other Sorts of this Plant in the *West-Indies*, but the two here mention'd are all the Sorts which I have yet seen in the *European Gardens*.

These Plants are Natives of the Rocks in the *West-Indies*, where they are thrust out from the Apertures thereof, and can receive but little Nourishment from the Soil; nor will they thrive when transplanted into another Situation, tho' it be in the same Degree of Heat, unless the Place be rais'd above the Level of the Ground with Stones and Rubbish.

The great Sort (which is very plenty in *Jamaica* and the other Islands in the *West-Indies*) is brought into *England* very often, but it rarely happens that they arrive here in perfect Health; for the People who bring them over, suppose they can't live without Moisture, which they seldom fail to supply all the Plants they bring over with, whereby they are rotted and destroy'd; and although these Plants do not presently shew the Damage they have sustain'd in their Passage, yet they seldom continue long before they perish: Therefore the best Method to bring them over, is to take them up intire from their Places of Growth, and pack them up in a large Box, with dry Hay or Straw, so that they may not wound each other in their Passage, observing to place them where neither Moisture nor Vermin can come to them, in which Way they will arrive in perfect Health; but the Persons who get them, should never chuse the oldest Plants, but rather such as are young and thriving, which are the most likely to continue any time with us.

But if they are brought over planted in Tubs, then the best Method is to fill the Tubs with Rubbish, and set the Plants therein, observing never to give them any Water during their Passage, nor suffer them to receive Wet, which will certainly damage them: And when they arrive in *England*, they should immediately be taken out of the Tubs, and planted into Pots fill'd with Lime-Rubbish and Sea-Sand intermix'd, and the Pots plung'd into a Hot-bed of Tanners Bark, to facilitate their taking Root: In which Bed they should remain until the Beginning of *October*, when they must be remov'd into the Stove, observing to place them in the warmest Situation, and be very careful not to let them have the least Moisture during the Winter-season, which will infallibly rot them. In the Spring of the Year, they may be remov'd out of the Stove into the Bark-bed again, at the same Season when the *Anana's* are taken out, and should be plac'd in such a Frame where they will only require a little Air in very hot Weather, but should not be water'd, for the Moisture which arises from the Tanners Bark will be sufficient for them.

This

This Plant is not very easy to increase in this Country, though I have seen some young ones that were produc'd from Seeds which ripen'd in *England*: These Seeds were sown upon a Pot of Lime-rubbish, and but gently cover'd with the same Mixture of Lime-rubbish and Sand (as was before order'd for these Plants) and the Pots plung'd into a Hot-bed of Tanners Bark, where the young ones began to appear in about ten Weeks after sowing, and by careful Management were preserv'd: But these Plants being of very slow Growth, do not arrive to any Magnitude in less than four or five Years, which renders this Method very tedious, and as it is not a very sure one, so 'tis seldom practis'd in *England*. I have also made Use of another Method, which has succeeded very well; i. e. when the Cap or Crown, which is produc'd on the Top of the Plant, has been injur'd, it occasions the Plant to send out many Side-heads, several of which I have taken off, and planted in Pots fill'd with Lime-rubbish and Sea-sand, plunging the Pots into a Hot-bed, and they have taken Root very well, and in one Year's time have made very handsome Plants, but these Heads should not be planted immediately after they are taken from the old ones, for the wounded Part will be apt to rot, therefore you should lay them by in a warm Part of the Stove for about a Fortnight; in which time the wounded Part will heal over, and they may then be planted without Danger: But you must observe to keep them very dry, otherwise they will rot in a short time.

The smaller Sort is not so common in *England*, which is occasion'd by its being very rare in our *American* Settlements, this being originally brought from the *Spanish West-Indies*, where are a great Number of other very strange Sorts.

This is only propagated by Seed, which is produc'd in great Plenty every Year from old Plants. The Fruit of this Kind is not thrust out from the Top of the Plant, as in the larger Sort, but is produc'd from the Hollows between the Protuberances of the Plant, and are preceded by a white cottony Substance, which surrounds the Flowers. These Fruit are nearly as large, and of the same Shape and Colour with those of the large Sort, and are as full of Seeds.

These Seeds must be sown in the same manner as the former, and the Plants preserv'd both *Winter* and *Summer* in the same Situation, and should have but little Moisture in very hot Weather; tho' in *Winter* they must not have any Water given them; for at that Season they are very apt to rot, if they receive any Moisture.

These Plants are preserv'd with great Care by such as are curious in Exoticks, they being of the most uncommon and wonderful Structure, greatly differing from any thing in the vegetable Kingdom, of *European* Growth, inasmuch that many Persons, at the first Sight of these Plants, have suppos'd them not natural Productions, but rather some artful Contrivance to amuse People, until they have more maturely consider'd their Parts.

The Fruit of both Sorts are eaten in the *West-Indies*: They have a very grateful Acidity in their Taste, which is extremely agreeable to the Inhabitants of those warm Countries: But I don't know any farther Use of the Plants.

MELOCARDUUS; *vide* Melocactus.

MELON; *vide* Melo.

MELONGENA; Mad-Apple.

The Characters are;

The Flower consists of one Leaf, shap'd like a Wheel, and cut into many Segments: From the Flower-Cup arises the Ovary, which becomes a fleshy Fruit, full of Kidney-shap'd Seeds.

The Species are;

1. MELONGENA; *fructu oblongo, violaceo*. *Tourn.* Mad-Apple, with an oblong Violet-colour'd Fruit.

2. MELONGENA; *fructu oblongo, albo*. *Tourn.* Mad-Apple, with an oblong white Fruit.

3. MELONGENA; *spinosa fructu rotundo, croceo*. *Tourn.* Prickly Mad-Apple, with a round Saffron-colour'd Fruit.

4. MELONGENA; *fructu rotundo, cum spinis violaceis*. *Tourn.* Mad-apple, with a round Fruit and Violet-colour'd Prickles.

There are several other Varieties of this Plant, which differ in the Size, Form or Colour of the Fruit, or in the Shape of their Leaves; but those here mention'd, are all that I have observ'd in the *English* Gardens.

These Plants are greatly cultivated in the Gardens of *Italy*, *Spain* and *Barbary*; in which Places the Inhabitants eat the Fruit of them boil'd with fat Flesh, putting thereto some scrap'd Cheese, which they preserve in Vinegar, Honey or Salt-Pickle all Winter, to provoke a Venereal Appetite: But in Summer, when the Fruit is just ripe, they usually gather them, and make them up into Puddings with several Sorts of Spices, and other Ingredients: Which Dish the *Italians* are very fond of.

They are propagated by Seeds, which must be sown upon a moderate Hot-bed in *March*; and when the Plants come up, they must be transplanted into another Hot-bed about four Inches asunder, observing to water and shade them until they have taken Root: after which you must give them a great Share of Air when the Weather is warm; otherwise they will draw up very weak: They must also be frequently water'd, without which they will make but a very indifferent Progress: But when they are grown so strong as to fill the Frame (which will be by the middle of *May*) you must transplant them out into a rich Spot of Ground at two Feet Distance, observing to preserve as much Earth to the Roots as possible when you take them up, otherwise they are subject to miscarry. You must observe to water them plentifully until they have taken Root, after which they will require but very little Care more than to keep them clear from Weeds, and in very dry Weather to give them some Water.

About the Middle of *June*, the Fruit will appear; at which time, if the Weather be very

very dry, you must often water them, which will cause the Fruit to grow very large, and increase their Number: Toward the latter End of *July* their Fruit will ripen, when you must preserve the Seeds of each Kind separate.

These Plants are only preserv'd as Curiosities in the *English* Gardens, the Fruit being never us'd in this Country, except by some *Italians* or *Spaniards*, who have been accusom'd to eat of them in their own Countries.

MELOPEPO; [this Plant is so call'd of *μῆλον* an *Apple* or *Melon*, because its Fruit comes near to the Size of a *Melon*; and *Pepo* a *Pompion*; because it participates of the Nature of a *Pompion*.] The Squash.

The Characters are;

It hath the whole Appearance of a Pompkin or Gourd; from which this differs in its Fruit, which is roundish, fleshy, streaked, angular, and for the most Part divided into five Partitions, inclosing flat Seeds adbering to a spongy Placenta.

The Species are;

1. **MELOPEPO**; *compressus*. C. B. P. The common or flat Squash.

2. **MELOPEPO**; *fructu maximo, albo*. Tourn. The large white Squash, commonly call'd The white flat Pumkin.

3. **MELOPEPO**; *fructu Citriformi*. Tourn. The Citron-shap'd Squash.

4. **MELOPEPO**; *verrucosus*. Tourn. The warted Squash.

5. **MELOPEPO**; *verrucosus, fructu & semine albis*. Tourn. Warted Squash, with white Fruit and Seed.

6. **MELOPEPO**; *flavescens, folio aspero*. Tourn. Yellowish Squash, with a rough Leaf.

There are several other Varieties of this Plant in the *West-Indies*, where they greatly abound, most of which are seminal Variations, and seldom continue long to produce the same Kinds from Seeds, at least with us they never do continue three Years together the same, but do vary most extraordinarily; for the Seeds sav'd from such Plants which grew upright, and did not produce Runners (as the more ordinary Sorts) the succeeding Year, were as luxuriant as any of other Kinds, and the Fruit was of a different Shape from those which the Seeds were taken from.

These are all propagated by sowing their Seeds in *March* upon a moderate Hot-bed; and when the Plants come up, they should have a great Share of Air, otherwise they will draw up so weak, as to be good for little: You must also gently refresh them with Water, as you shall find they require it. In *April* they must be transplanted out where they are designed to remain (which in *England* is most commonly upon old Dung-hills, over which the Vines will spread, and produce a great Quantity of Fruit:.) If you plant them in an open Spot of Ground, you should dig Holes at about fourteen Feet square, into each of which you should lay a Barrow full of hot Dung, making a Hollow in the Middle to receive the Plants, which must be fill'd with

good rich Earth; then cover the Dung all over, Top and Sides, with the Earth that came out of the Hole, placing a Glass over the Middle; in which manner it should remain until the Earth in the Holes begins to warm, (which is commonly in twenty-four Hours after making) when you must take them up out of the Seed-bed, and plant two of 'em into each Hole, observing to water and shade them until they have taken Root: after which you must let them have much free Air; and when they begin to send forth their Shoots, you must take off the Glasses and permit them to run, observing only to clear them from Weeds, and in very dry Weather to refresh them now and then with a little Water.

In *July* these Plants will produce a great Quantity of Fruit, which some People are very fond of: These they gather while young, and boil them with Meat instead of Turnips: But notwithstanding what some Persons have advanc'd concerning the Goodness of this Fruit, yet, from several Trials which I have made, I could not bring my Palate to relish them, for they have a very great Flatulency in their Taste, which is agreeable to very few Persons: But in the *West-Indies*, where there is a Scarcity of Garden Roots and Plants, these and many other Sorts are esteemed Delicacies.

MELONRY, or **MELON-GROUND**, is an Apartment in the Kitchen-Garden for the Propagation of *Melons*.

This Spot of Ground should be open to the *South-East* Sun, but shelter'd from the *West*, *North-West* and *North-East* Winds, by Walls, Pales or Hedges; it should also be upon a dry Soil, for nothing is more injurious to these Plants than much Wet: and in the Spring it often proves very wet Weather; when if the Soil be very wet, there will be no making the Ridges until it is very late. You should also contrive to place it as near to the Dung as possible, which will save a great Deal of Labour in wheeling the Dung; and, if possible, you should contrive to have a Pond of Water near it, which in very dry Weather, will be very useful to water the *Melons*.

As to the Size of the Ground, that must be proportion'd to the Quantity of Ridges intended, which you may easily calculate by allowing eight Feet and a half for every Ridge, and the Holes plac'd at about three Feet asunder; but it is the best Way to allow Room enough where you are not straiten'd for it.

This Ground should be inclos'd with a Reed-Fence, and kept constantly lock'd up during the Time that the *Melons* are growing, for if they are expos'd to every Person that walks in the Garden (most of whom have a Curiosity to handle the Vines, and look after the Fruit) it will be of ill Consequence, nothing being more injurious to these Plants than frequent tumbling or disturbing their Leaves.

The common Practice in most Gentlemens Gardens, is, to inclose a Spot of Ground either with Walls or Pales, which they constantly appropriate to this Purpose: But this

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is by no means a good Method; for it rarely happens that these succeed well longer than two Years in the same Place, unless the Soil be removed, and fresh brought in, which is very expensive; therefore the best Way is, to have a sufficient Parcel of Reeds made into Pannels, which may be annually moved from Place to Place, so that you need not continue your Ridges longer than one Year in the same Place. And if you have a Piece of Ground which is large enough to divide into four such Places, the Fence may be every Year remov'd forward, till the Whole has been occupy'd; after which you may return to the Spot where you began, which, by that Time, will be as good as fresh Earth: And hereby, without much Trouble, you may remove them every Year; for as one of the Sides will remain unremov'd every Time the Fence is carried forward, so the Labour will not be so great as if it were wholly remov'd to some Distance; and these Reed-Fences are much preferable to either Walls or Pales for this Purpose.

MENTHA, [*Μένθα*, according to the Antients, a Goddess, and also according to the Poets. The Antients also gave it the Name of *Sweet-smelling*; and where this Word is found, this Plant is understood. *Mentha* is likewise so call'd of *Mens*, Lat. the *Mind*, because this Plant strengthens the Mind: It hath the same Smell and Taste, and is much the same in all the Plants of this Genus.] *Mint*.

The Characters are;

It is a verticillate Plant, with a labiated Flower consisting of one Leaf, whose Upper-lip is arched, and the Under-lip is divided into three Parts; but both of them are so cut, that the Flower seems to be divided into four Parts, the two Lips scarcely appearing; these Flowers are collected into thick Whorles in some Species, but in others they grow in a Spike; each Flower having four Seeds succeeding it, which are inclos'd in the Flower-cup: To which may be added, It hath a creeping Root, and the whole Plant has a strong aromattick or balsamick Scent.

The Species are;

1. **MENTHA**; *angustifolia, spicata*. C. B. P. Common Spik'd-Mint, usually call'd Spear-Mint.

2. **MENTHA**; *spicis brevioribus & habitioribus, foliis Menthae fuscae, sapore fervido piperis*. Raii. Syn. Pepper-Mint.

3. **MENTHA**; *sylvestris, folio longiore*. C. B. P. Long-leav'd Horse-Mint, or *Mentastrum*.

4. **MENTHA**; *arvensis, verticillata, birsuta*. J. B. Water-Mint with whorled Coronets, commonly call'd Water-Calamint.

5. **MENTHA**; *aquatica, seu Sisybrium*. J. B. Water-Mint.

6. **MENTHA**; *Sisybrium dicta birsuta, glomerulis ac foliis minoribus ac rotundioribus*. Raii. Syn. Orange-Mint.

7. **MENTHA**; *spicata, folio variegato*. C. B. P. Spear-Mint, with a variegated Leaf.

8. **MENTHA**; *rotundifolia, palustris seu aquatica major, folio variegato*. Tourn. The

Great Round-leav'd Water-Mint, with a variegated Leaf.

9. **MENTHA**; *angustifolia, spicata, glabra, folio rugosiore, odore graviore*. Raii. Syn. Spear-Mint, with a rugged Leaf, and strong Scent.

10. **MENTHA**; *Chalepense, angustifolium, raro florens*. Boerb. Ind. Narrow-leav'd Aleppo Mint, which rarely flowers.

There are several other Sorts of *Mint*, which are preserv'd in some curious Botanick Gardens, many of which are Natives of *England*; but as they are not cultivated for Use, so I shall omit them in this Place, those above-mention'd being the Sorts which are commonly propagated for Kitchen or Medicinal Uses.

The first Sort is the most commonly cultivated in the *English* Gardens, both for the Use of the Kitchen and Medicine; but the second Sort is by some greatly esteem'd for its Heat, to make a simple Water: This, at present, is not very common in the Gardens, but has been found growing wild in several Parts of *England*. The third Sort is also us'd in Medicine, but is rarely cultivated in Gardens, being found in great Plenty in several Places near *London*. The fourth and fifth Sorts are very common by the Sides of Ponds, and on moist Soils, in divers Parts of *England*, and are rarely cultivated in Gardens: These are both us'd in Medicine, but the Markets are supply'd with them from the Fields. The seventh and eighth Sorts are preserv'd in Gardens, for the Beauty of their variegated Leaves: As are the ninth and tenth Sorts, for their Oddness; the one having curl'd Leaves, and the other being very white, but seldom produces Flowers in *England*.

All the Sorts of *Mint* are easily propagated by parting the Roots in the Spring, or by planting Cuttings during any of the Summer Months; but should have a moist Soil: And after planting, if the Season should prove dry, they must be often water'd, until they have taken Root; after which, they will require no farther Care but only to keep them clear from Weeds: They should be planted in Beds about four Feet wide, allowing a Path two Feet wide, to go between the Beds to water, weed, and cut the Plants. The Distance they should be set is about four or five Inches, or more, because they spread very much at their Roots; for which Reason the Beds should not stand longer than three Years before you plant fresh; for by that Time the Roots will be matted so closely, as to rot and decay each other, if permitted to stand longer. There are some People who are very fond of *Mint-Sallet* in *Winter* and *Spring*; in order to obtain which, they take up the Roots before *Christmas*, and plant them upon a moderate Hot-bed pretty close, covering them with fine Earth about an Inch thick, and cover the Bed either with Mats, or Frames of Glass; in these Beds the *Mint* will come up in a Month's Time, and be soon fit to cut for that Purpose.

When the Herb is cut for Medicinal Use, it should be done in a very dry Season, just when

when it is in Flower; for if it stand longer, it will not be near so handsome, nor so well-tasted; and if it be cut when it is wet, it will change black, and be little worth: This should be hung up to dry in a shady Place, where it may remain until it be used.

If the Soil be good in which these Plants are to be set, they will afford three Crops every Spring: But after July they seldom prove good; therefore what Shoots are produc'd after that Time, should be permitted to remain till Michaelmas, when you must cut them down close; and after having clear'd the Beds from Weeds, you should spread a little fine rich Earth all over them, which will greatly encourage the Roots against the succeeding Spring.

MENTHA CATARIA; *vide* Cataria.

MENYANTHES, is *Trifolium Palustre*, or Bog-bean.

This Plant is common upon boggy Places in divers Parts of England; but is never cultivated in Gardens, for which Reason I shall not trouble the Reader with any farther Account of it.

MERCURIALIS: [This Plant takes its Name from Mercury, because the Antients had a Notion, that the God Mercury brought this Plant into Use.] Mercury.

The Characters are;

The Leaves are crenated, and grow by Pairs opposite: The Cup of the Flower consists of one Leaf, which expands, and is cut into three Segments; these are Male and Female in different Plants: The Flowers of the Male grow in long Spikes, and consist of many Stamina and Apices, which are loaded with Farina: The Ovary of the Female Plant becomes a testiculated Fruit, having a single round Seed in each Cell.

The Species are;

1. **MERCURIALIS**; *testiculata*, five mas *Dioscoridis* & *Plinii*. C. B. P. The Testiculated Mercury, vulgarly call'd The Male French Mercury.

2. **MERCURIALIS**; *spicata*, five *famina* *Dioscoridis* & *Plinii*. C. B. P. The Spiked French Mercury.

3. **MERCURIALIS**; *montana*, *testiculata*. C. B. P. Testiculated Mountain Mercury, commonly call'd Dogs Mercury.

4. **MERCURIALIS**; *montana*, *spicata*. C. B. P. Spiked Mountain, or Dogs Mercury.

5. **MERCURIALIS**; *fruticosa*, *incana*, mas. Boerb. Ind. Hoary Shrubby Male Mercury.

6. **MERCURIALIS**; *fruticosa*, *incana*, *testiculata*. Tourn. Shrubby Hoary Testiculated Mercury.

The two first Sorts are annual Plants, which grow wild in divers Parts of England, and are rarely propagated in Gardens: The Seeds thereof being sown, produce the two Sorts promiscuously, and are both gather'd indifferently for Medicinal Use. These Seeds should be sown as soon as they are ripe by those who would cultivate it: They will grow upon any Soil or Situation.

The third and fourth Sorts grow wild in shady Lanes in divers Parts of England, where they spread greatly at the Roots: These are never us'd in Medicine.

The fifth and sixth Sorts are not Natives of this Country, but are preserv'd in curious Botanick Gardens for Variety: These may be propagated by sowing the Seeds soon after they are ripe in a Bed of fresh Earth, where, if the Seeds are good, the Plants will come up the succeeding Spring, and endure the Cold of our ordinary Winters very well: But if the Plants from which the Seeds are taken, have not had some of the Male Plants growing amongst them, the Seeds will not grow, as I have several times experienc'd.

MESPILUS; [*Misum.*] The Medlar.

The Characters are;

The Leaves are either whole, and shap'd like those of the Laurel, as in the manur'd Sorts, or laciniated, as in the wild Sorts: The Flower consists of five Leaves, which expand in Form of a Rose: The Fruit is umbilicated, and are not eatable till they decay, and have for the most part five hard Seeds in each.

The Species are;

1. **MESPILUS**; *Germanica*, *folio laurino*, non *ferrato*, five *Mespilus Sylvestris*. C. B. P. The Common Medlar, commonly call'd The Nottingham Medlar.

2. **MESPILUS**; *folio laurino*, *major*. C. B. P. The Large Dutch Medlar.

3. **MESPILUS**; *Apii folio*, *sylvestris*, *spinosa*, five *Oxyacantha*. C. B. P. The Common Hawthorn.

4. **MESPILUS**; *spinosa*, five *Oxyacantha*, *flore pleno*. Tourn. The Double-flowering Hawthorn.

5. **MESPILUS**; *Apii folio laciniato*. C. B. P. The Azarola or Neapolitan Medlar.

6. **MESPILUS**; *spinosa*, *Pyri folio*. H. L. The Pyracantha or Ever-green Thorn.

7. **MESPILUS**; *feu spina acuta*, *biflora*, *Britannica*. Park. Theat. The Glastenbury Thorn.

8. **MESPILUS**; *spinosa*, five *Oxyacantha*, *Virginiana*. H. L. The Cockspur or Virginian Hawthorn.

9. **MESPILUS**; *aculeata*, *pyrifolia*, *denticulata splendens*, *fructu insigni rutilo*, *Virginienfis*. Pluk. Phyt. The Virginian Medlar, with shining Leaves, and very red Fruit, commonly call'd The Virginian Azarol with red Fruit.

10. **MESPILUS**; *Virginiana*, *Apii folio*, *vulgari similis major*, *grandioribus spinis*. Pluk. Phyt. Virginian Hawthorn with long strong Thorns.

11. **MESPILUS**; *Prunifolia*, *Virginiana*, non *spinosa*, *fructu nigricante*. Pluk. Phyt. Virginian Hawthorn, with a Plum-leaf and black Fruit.

12. **MESPILUS**; *folio subrotundo*, *fructu rubro*. Tourn. The Dwarf Medlar with red Fruit.

13. **MESPILUS**; *folio rotundiore*, *fructu nigro*, *subdulci*. Tourn. Dwarf Medlar with black Fruit.

14. **MESPILUS**;

14. *MESPILUS; Apii folio, sylvestris, spinosa, five Oxyacantha, fructu albo.* Cat. Plant. Hort. The common Hawthorn, with white Fruit.

15. *MESPILUS; Americana, non spinosa, fructu luteo.* The American Haw, with yellow Fruit.

The first of these *Medlars* was formerly more common in the Gardens and Nurseries than at present, for since the *Dutch Medlar* has been introduc'd, it hath obtain'd the Preference, the Fruit of this being much larger and better flavour'd than the old one, which hath occasion'd their being cultivated in greater Plenty.

Both these Sorts may be propagated by budding or grafting 'em upon the *Hawthorn*, or the *Pear-stock*, upon either of which they will take very well; and may be afterwards transplanted into the Fruit-Garden, either in Standards or train'd against an *Espalier*, in both which Methods they will succeed very well; but if the larger Sort be train'd on an *Espalier*, the Fruit will be much larger: But you must be careful in pruning, not to shorten their bearing Branches, for the Fruit being, for the most part, produc'd at the Extremity thereof; if they are shorten'd, it will be cut away.

These Plants will grow upon almost any Soil, but the Fruit will be much larger upon a strong Soil, rather moist than dry; though upon a middling Soil they are generally best flavour'd.

These Fruits are permitted to remain upon the Trees till *October*, when they will begin to fall; at which time they must be gather'd, when dry, and laid by in a dry Place, until they become soft, and begin to decay, which is commonly about a Month after they are gather'd, when they will be fit to be eaten; before which they are so very harsh that it is almost impossible to eat them.

The third Sort is so very common in *England*, that it would be to little Purpose to spend much Time in treating of it, since the great Use to which it is apply'd in *England*, is to make Fences, the manner of doing which is already described under the Article of *Fences and Hedges*; but I would only mention in this Place, that there are two or three Varieties of this Plant, commonly observed in the Hedges near *London*, which differ in the Size of their Leaves and Fruit; but that Sort which produces the smallest Leaves is the best worth cultivating for Hedges, because their Branches always grow close together, so that the Hedge will clip much closer, and appear more beautiful: for it is a common Observation, That the Branches of all Sorts of Trees grow in a proportionable Distance to the Size of their Leaves.

The fourth Sort is a Variety of the third, from which it differs in having fair double Flowers. This is propagated by being budded or grafted upon the common Sort, and may be train'd up with regular Stems to the Height of twelve or fourteen Feet, and when planted in Wildernesses or other Plantations of Trees,

being intermix'd with other flowering Trees of the same Growth, makes a very fine Appearance, during the Season of its Flowering; which is commonly most part of *May*; the Flowers being produced in large Clusters, as in the common Sort, but are very double: This Tree is pretty common in the Nurseries near *London*.

The *Azarola* or *Neapolitan Medlar*, has been introduced from *Italy*, where the Fruit is greatly esteemed. This is also propagated by budding or grafting it upon Stocks of the common *Hawthorn*, and should be transplanted into a moist Soil and a warm Situation, where it will produce great Quantities of Fruit annually in *England*, which are shap'd like those of the common *Hawthorn*, but much larger, and must be preserv'd till they begin to decay before they are eaten, as the common *Medlar*.

I have observ'd these Trees in many Places planted against warm Walls, as supposing them too tender to produce Fruit in this Climate, without such Assistance; which is a very great Mistake, for I have seen much more Fruit upon Standard Trees than were upon those against Walls, and they ripen'd well and were better tasted.

The *Pyracantha* or *Ever-green Thorn*, was formerly in greater Esteem than at present; it is commonly planted against Walls or Buildings, where it affords an agreeable Prospect in Winter, (especially if it has Plenty of Fruit) the Fruit being at that Season of a beautiful red Colour, and are commonly produced in very large Clusters, which together with its ever-green Leaves, renders it worthy of a Place in every good Garden. But in order to have Fruit upon every Part of the Tree, in which its greatest Beauty consists, there should always be a Succession of young Branches train'd in, for the Fruit is always produc'd upon the second and third Years Wood; and all those Branches which are older never produce any; for want of rightly observing this Method, most of the Trees of this kind seldom have any Fruit but toward their extream Parts, which is one Reason these Trees have been so much neglected of late Years.

The Branches of this Tree are very flexible, so that it cannot be train'd up to a Standard, but must always have the Assistance of a Wall, or some other Building to support it. It is very hardy, and will grow in almost any Soil or Situation, but it agrees best with a dry Soil, in which it will always produce a greater Number of Fruit.

This may be propagated by laying down the tender Shoots, which are commonly two Years before they will be rooted enough to transplant; (but notwithstanding this, it is a more expeditious Method than to raise them from Seeds, which rarely come up until the second Year, and are but of slow Growth the two succeeding Years) then they may be either planted where they are to remain, or into a Nursery for two or three Years, where you may train them according to the Places where they are design'd to be planted. It is

commonly three Years after they are planted out before they begin to produce Fruit.

The *Glaftenbury Thorn* is preserv'd in many Gardens as a Curiosity; this often produces some Bunches of Flowers in Winter, and afterwards flowers again at the Season with the common Sort, but doth in no other respect differ from the common *Hawthorn*; the fabulous Story of its budding on *Christmas-day* in the Morning, flowering at Noon, and decaying at Night, is now with good Reason disbeliev'd; for although it may sometimes happen that there may be some Bunches of Flowers open on that Day, yet for the most part it is later in the Year before they appear; but this in a great measure depends on the Mildness of the Season. This Sort may be propagated by budding or grafting it upon the common *Hawthorn*, and should be planted in a warm Situation, which will greatly promote the Flowering in the Winter; for if they are too much expos'd to cold Winds, the Flower-buds will decay without opening, tho' in other respects the Plant is equally as hardy as the common Sort, and may be treated in the same manner.

The *Cockspur Hawthorn* is of larger Growth than any of the former, and is very hardy: This may be propagated by sowing the Seeds in the same manner as the common *Hawthorn*, and they commonly abide in the Ground till the second Year, as they do; therefore the most expeditious Way to increase this Plant is to bud or graft it upon the common *Hawthorn*, tho' I must confess, that the Trees thus propagated will not arrive to the Magnitude as those generally do which are propagated from Seeds, but will produce Fruit much sooner; but where a Person intends to have them in Perfection, they should always be propagated from Seeds. This Sort will grow to the Height of eighteen or twenty Feet, and may be train'd up with regular Stems and Heads, and when planted amongst other Trees of the same Growth, they make an agreeable Variety; for in the *Spring*, when they are in Blossom, they are very pleasing, the Flowers being very large, and are produc'd in great Bunches at the Extremity of their Branches; and in *Autumn*, when the Fruit is ripe, which is very large, and grows in great Clusters, they have a beautiful Appearance, and are esteem'd very good Feed for Deer.

The ninth, tenth, and eleventh Sorts were brought from *Virginia* several Years since, and are preserved as Curiosities by such Persons as are Lovers of Trees. These may be propagated from Seeds, as the other Sorts, or by budding or grafting 'em upon the common *Hawthorn*; and may afterwards be transplanted into Wilderness Quarters amongst other Trees of the same Growth, where they will afford an agreeable Variety.

The ninth Sort will grow larger than the other two, and if rais'd from Seeds, will equal the *Cockspur Hawthorn*; and the Flowers and Fruit are full as large as those, so that it is very proper to be intermix'd therewith.

The tenth and eleventh Sorts commonly grow to the Size of our common *Hawthorn*, with which they may be intermix'd, for Variety, in Wilderness Plantations. The Fruit of these two kinds are hardly so large as those of the common *Hawthorn*, but whether any of these Fruits are eatable I don't at present know, tho' I believe they are much the same as the common Sort.

The fourteenth Sort is a Variety of the Common *Hawthorn*, which was observ'd some Years since in *Hertsfordshire*: but whether the Seeds of this Kind will produce the same again, is what I can't at present determine; however it may be propagated by budding or grafting it upon the Common *Hawthorn*, which is the only sure Method to preserve the Variety; tho' there is nothing more in it, than that it is uncommon.

The fifteenth Sort has been lately introduced among us from *America*: This is different from the other Sorts in the Shape of the Leaves, and hath no Thorns upon the Branches: but whether the Fruit will continue of the same Colour as the Original, can't as yet be determin'd; since there are no Plants in *England* large enough to produce Fruit, that I know of. This may be propagated by budding or grafting it upon the Common *Hawthorn*, and is worthy of a Place in all curious Collections of Trees.

The twelfth and thirteenth Sorts are of humbler Growth, seldom rising above five or six Feet high, and are proper to intermix with Shrubs of the same Growth, where, by the Variety of their woolly Leaves, together with their Flowers and Fruit, in their Seasons, they add greatly to the Variety of such Plantations: They may be easily propagated by laying down their tender Branches, which, in one Year, will be rooted sufficiently to transplant, when they may be plac'd where they are to remain, or planted into a Nursery, and train'd up to regular Heads; by which Method they will be less liable to miscarry, than if they were plac'd to remain in the Wilderness immediately.

The twelfth Sort produces great Quantities of Suckers from the Roots, which may be taken off in the *Spring*, and transplanted into a Nursery two or three Years, until they have acquired Strength enough to transplant for good where they are to remain; by which Method they may be greatly increas'd: but the Plants thus rais'd will be more subject to produce a great Number of Suckers from their Roots, which, if not yearly taken off, will grow up into a Confusion, and starve the old ones.

They produce their Flowers in *April* and *May*, and their Fruits are commonly ripe in *August*: but these are of no Use, except to propagate the Plants; which being a tedious Method, and the Layers taking Root so freely, renders it not worth practising; tho' it may happen that some Varieties may be obtain'd this Way, as is often found in many other Trees and Shrubs.

METHO-

METHONICA: The Superb Lily; *vulgô.*

The Characters are;

It hath a fleshy Root in Form of a strait Ruler, which is venomous: The Stalk is climbing: The Leaves grow alternately, and shap'd like those of the Lily, but have a Clasper at the End: The Flower is naked, consisting of six Leaves, which are elegantly sinuated, feather'd, and reflex'd back, with six Stamina (or Threads); in the Center of which is the Ovary, which becomes an oval Fruit, divided into three Cells, containing several round Seeds.

There is but one Species of this Plant at present known, which is,

METHONICA; *Malabarorum. H. L.* Malabar *Metthonica*, or The Superb Lily of Ceylon.

This beautiful Plant is propagated by parting the Roots in *August* (when the green Leaves are decay'd); which should be planted into Pots fill'd with light sandy Earth, and may be expos'd to the open Air for about a Fortnight or three Weeks after, placing the Pots where they may have the Morning-Sun till eleven a Clock; and if the Season should prove very dry, you must now and then gently refresh them with Water, but you must avoid giving them too much, (especially while the Roots are unactive) which will rot them in a short time.

Toward the End of *August* or the Beginning of *September*, you must remove the Pots into the Stove, placing them where they may have free Air, but so as to have a warm Situation, observing as was before directed, to refresh them gently with Water, but not to give them much until they appear above-ground, which is commonly in *November*, provided they have Warmth enough, otherwise they will not come up till after *Christmas*: When the Leaves begin to appear above-ground, you must increase the Quantity of Water before given them, and place a Stick down by the Root, to which the Stem should be fasten'd to support it, otherwise it will trail upon the Ground: You should also observe to place the Pots so that they may not stand too near any large growing Plants which may hang over them, whereby these Plants will be drawn up, which will prevent their Flowering; but they must, at this Season, be kept pretty warm, in order to encourage them to flower. The Heat with which they thrive best is about ten Degrees above temperate, (as mark'd on Mr. *Fowler's Botanical Thermometers*) but you must never let them have a less than temperate Heat, lest the Roots should perish.

The Off-sets taken from the old Roots are commonly two or three Years before they flower; during which time they should not be transplanted, but the Earth in the upper Part of the Pots should be taken out, and fresh put in every Year to encourage the Roots, being very careful in doing this not to injure or disturb the same. In *July* and *August* the Pots may be expos'd to the open Air, if the Season be warm, but all the other Part of the Year they must be continu'd in the Stove.

MEUM; [of *μῆν* *lēf*, because the Leaves of this Plant are very small.] Spiguel.

The Characters are;

It is an umbeliferous Plant, with very narrow Leaves: The Seeds are large, oblong and striated: To which maybe added, it hath a perennial Root.

This Plant is propagated in the *Physick-Gardens*, for Medicinal Use, but is very seldom found in other Gardens. It may be propagated by Seeds, which should be sown in *Autumn* soon after they are ripe; and in the *Spring* the Plants will appear, when they should be carefully clear'd from Weeds, and in very dry Weather must be refresh'd with Water. In this Place the Plants may remain until the *Autumn* following, when they may be transplanted into a shady Border about a Foot asunder, where they may remain for Use. They may also be propagated by parting their Roots in *Autumn*, which is the most expeditious Method.

MEZEREON; *vide Thymelea.*

MICROSCOPE, a Dioptrical Instrument, by means of which, very minute or small Objects are represented very large, and capable of being view'd very distinctly, according to the Laws of Refraction.

This Instrument may be of singular Use to a curious Inquirer into the Operation of vegetative Nature, by viewing nicely the several minute Vessels and Parts of Vegetables, in order to discover their various Uses, and how the Business of Vegetation is carry'd on.

MILDEW is a Disease that happens to Plants, and is caus'd by a dewy Moisture which falls on them, and continuing for want of the Sun's Heat to draw it up, by its Acrimony corrodes, gnaws and spoils the inmost Substance of the Plant, and hinders the Circulation of the nutritive Sap, upon which the Leaves begin to fade, and the Blossoms and Fruit are much prejudic'd. Or,

Mildew is rather a concrete Substance, which exudes thro' the Pores of the Leaves.

What the Gardeners commonly call *Mildew*, is an Insect which is frequently found in great Plenty preying upon this Exudation.

Others say, That *Mildew* is a thick clammy Vapour exhal'd in the Spring and Summer from Plants, Blossoms, and even the Earth itself, in close still Weather, where there is neither Sun enough to draw it upwards to any considerable Height, nor Wind of Force strong enough to disperse it, and that it hanging in the lower Regions, when the Cold of the Evening comes on, it condenses and falls on Plants, and with its thick clammy Substance stops the Pores, and by that means prevents Perspiration, and hinders the Sap from ascending to nourish their Flowers, Shoots, &c.

Others say, That *Mildew* is a corrosive or nipping Dew, proceeding from the Vapours that are exhal'd by the Earth, which being drawn up, and falling down again on the tender opening

ing Buds, infects them by its Acrimony, and hinders the Circulation of the nutritious Sap in the proper Vessels; upon which the Leaves begin to fade, and the Blossoms and Fruit receive a very great Prejudice.

Some make this Observation, That the Places most liable to *Mildew* are inclos'd Grounds and Valleys, and those that lie tending to the East; and the Reasons that they give why those Grounds which lie from the Horizon to the East are most subject to *Mildew* and *Blastings*, may be by the Sun's attracting those Vapours towards it after the manner that a great Fire in a Room draws the Air to it: So the Sun having set these in Motion, and not having Strength enough to draw them into the middle Region, to form them into a Cloud, he does yet draw them till he is below our Horizon, and then these *Dews* tend to the Earth from whence they were exhal'd, and in Motion to the West, do, as it were, fall upon that Ground which lies Eastward at right Angles, and therefore is most offensive to them.

But I take the true Cause of the *Mildew* appearing most upon Plants which are expos'd to the East, to proceed from a dry Temperature in the Air when the Wind blows from that Point, which stops the Pores of Plants and prevents their Perspiration, whereby the Juices of the Plants are concreted upon the Surface of their Leaves, which being of a sweetish Nature, Insects are inticed thereto, where finding proper Nutriment, they deposit their Eggs, and multiply so fast as to cover the whole Surfaces of Plants, and by their corroding the Vessels, prevent the Motions of their Sap; and it is very probable that the Excrements of these Insects may enter the Vessels of Plants, and by mixing with their Juices may spread the Infection all over them: For it is observable, that whenever a Tree has been greatly affected by this *Mildew*, it seldom recovers it in two or three Years, and many times never is intirely clear from it after.

Others suppose, that the Reason why Valleys afford more Moisture than Hills, is because of the *Dew* which is attracted from the Earth and Herbs as before; and that they do afford more Moisture than Hills (they say) is often seen by the Mists which are more frequent on them than on Hills: this being drawn by the Sun in the Day-time, and wanting Wind to assist its Motion, hangs in the lower Region, and when the Sun sets, it falls upon the Plants with its thick clammy Substance, and hinders the Sap of the Plant or Tree from ascending to nourish its Flowers or Shoots in those whose Bark is tender and young, and the Pores open with the Heat of the Season.

This *Dew* has been observ'd in the great-leav'd *Cherries*, such as the *Black Heart*, the *White Heart*, &c. to fall upon them at the Top, just at the Beginning of the Midsummer-shoot, which has so stopp'd the Shoot that it has shot forth in other Places below; and that on the Top of these Shoots there have been

many small Flies feeding on this *Dew*, and that it may plainly be seen and tasted on the Leaves of Oak and Maple.

Some are of Opinion, that *Mildews* and *Blight*s are the same thing: But others again, That *Mildew* is quite another thing than *Blastings*. They say, *Mildews* are caus'd from the Condensation of a fat and moist Exhalation in a hot and dry Summer, from the Blossoms and Vegetables of the Earth, and also from the Earth itself, which is condens'd into a fat glutinous Matter by the Coolness and Serenity of the Air, and falls down on the Earth again; part of which rests upon the Leaves of the Oak and other Trees, whose Leaves are smooth, and for that Reason do not so easily admit the Moisture into them, as the Elm and other rougher Leaves do.

Other Parts of *Mildew* rests upon the Ears and Stalks of *Wheat*, bespotting the same with a different Colour from what is natural, being of a glutinous Substance by the Heat of the Sun, and binds up so close the tender Ears of *Wheat*, that it prevents the Growth, and occasions it to be very light in the Harvest.

Some are of Opinion, That *Mildews* are the principal Food of *Bees*, it being sweet and easily convertible into Honey.

MILIUM; [so call'd of *Mille*, Lat. a *Thousand*, because of the Multitude of its Grains.] Millet.

The Characters are;

It hath a loose divided Pannicle; and each single Flower hath a Calyx consisting of two Leaves, which are instead of Petals, to protect the Stamina and Pistillum of the Flower, which afterwards becomes an oval shining Seed.

The Species are;

1. MILIUM; *femine luteo*. C. B. P. Yellow or Common Millet.
2. MILIUM; *femine albo*. C. B. P. Millet, with a white Seed.
3. MILIUM; *femine nigro*. C. B. P. Millet, with a black Seed.
4. MILIUM; *Arundinaceum, subrotundo femine, Sorgo nominatum*. C. B. P. Reed-like Millet, with roundish Seeds, commonly call'd Sorgo or Guiney Corn.

There are some other Varieties of these Plants which chiefly differ in the Colour of their Seeds, which will be to little Purpose to enumerate in this Place, those here mention'd being the principal Sorts which I have observ'd growing in England.

The three first Sorts are Varieties of each other, and only differ in the Colour of their Seeds, which Difference will arise from the same Seeds very often; but the Yellow is always preferr'd, though the White is no way inferior to it, but the Black Sort is esteem'd little worth.

These Plants were originally brought from the Eastern Countries, where they are still greatly cultivated, from whence we are furnished annually with this Grain, which is by many Persons greatly esteem'd for Puddings, &c.

These

these are never cultivated in *England* but by way of Curiosity in small Gardens, where the Seeds do generally ripen very well.

They must be sown the Beginning of *April* upon a warm dry Soil, but not too thick, because these Plants divide into several Branches, and should have much Room; and when they come up, they should be clear'd from Weeds, after which they will, in a short time, get the better of them, and prevent their future Growth. In *August* these Seeds will ripen, when it must be cut down and beaten out, as is practis'd for other Grain.

The *Guiney Corn* arises commonly to be ten or twelve Feet high, and has jointed Stalks like the Reed; upon the Tops of which the Panicles are produc'd, which are very large, as are also the Grains. This Sort will come up very well, if sown as the former, but seldom perfects its Seeds with us, except the Season be very warm.

MILLEFOLIUM; [so call'd, as if the Leaves had a thousand Incisions. *Pliny* relates, That *Achilles* having been instructed by *Chiron* in Physick and the Art of curing Wounds, cured *Telephus*, wounded by his own Sword, with this Plant; and hence it was call'd *Achillea*. It is also call'd *Stratiotes*, of *ægle* an Army, because this Plant is useful in curing the Wounds of Soldiers in an Army.] *Yarrow*, *Milfoil*, or *Nole-bleed*.

There are several Sorts of this Plant which are cultivated in Botanick Gardens for Variety; but as they are rarely propagated for Use, I shall pass them over without naming them, and only observe, that the common Sort, which grows in great Plenty upon dry Banks in most Parts of *England*, is that which is order'd for Medicinal Use.

MIMOSA: The Sensitive Plant.

The Characters are;

The Flower consists of one Leaf, which is shap'd like a Funnel, having many Stamina in the Center: These Flowers are collected into a round Head; From the Bottom of the Flower rises the Pistillum, which afterwards becomes an oblong, flat, jointed Pod, which opens both ways, and contains in each Partition one roundish Seed.

The Species are;

1. *MIMOSA*; seu *frutex sensibilis*. *Tourn.* The common Sensitive Plant.

2. *MIMOSA*; *humilis*, *frutescens*, & *spinosa*, *siliquis conglobatis*. *Plum.* Dwarf Shrubby Humble Plant, having Thorns, and the Pods growing together in Bunches.

3. *MIMOSA*; *spinis horridiuscula*, & *sensitiva magis*. *H. R. Par.* Greater Sensitive (or Humble Plant) with very sharp Thorns.

4. *MIMOSA*; *latifolia*, *sculis in orbem glomeratis*. *Tourn.* Broad-leav'd or Common Humble Plant.

5. *MIMOSA*; *spuria de Pernambuco*, dicta *Mimosa Italica*. *Zan.* The Slothful Sensitive Plant; *vulgô*.

There are some other Species of this Plant which grow in the warm Parts of *America*,

but those here mention'd, are what I have observ'd in the *English* Gardens.

The first Sort is commonly known by the Name of *Sensitive Plant*, to distinguish it from the others, which are generally call'd *Humble Plants*, because upon being touch'd, the Pedicle of their Leaves falls downward, whereas the Leaves of the other Sort are only contracted upon the Touch.

These Plants are all propagated from Seeds, which must be sown upon a Hot-bed early in the *Spring*; and when the Plants come up, they must be transplanted into small Pots fill'd with light rich Earth, and plung'd into a fresh Hot-bed, observing to water and shade them until they have taken Root: After which you must often refresh 'em with Water, and let 'em have Air in Proportion to the Warmth of the Season, always observing to keep the Bed in a good Temper for Heat, as also to cover the Glasses every Night with Mats, which will greatly facilitate their Growth.

With this Management, in about a Month's time, the Plants will have greatly advanc'd, and their Roots will fill the Pots; therefore you must remove them into larger Pots, by shaking them out of those they are in, together with the Earth, which should be preserv'd to their Roots; and (after having pared off the Roots which were matted round the Outside of the Ball of Earth) you must place the Plants into the larger Pots, filling them up with the like rich Earth; then plunge them into the Hot-bed, observing to water them well until they have taken Root; and if you see the Plants inclinable to droop, when the Sun shines warm upon the Glasses, you must shade them until they have recover'd and are able to endure the Heat.

You must also observe to give them a greater Share of Air, as the Season advances in Warmth, but you must never expose them to the open Air, which will not only retard their Growth, but also destroy the sensitive Quality; so that I have seen some Plants of these Kinds, which after having been expos'd to the open Air a few Days, have intirely lost their Motion.

The first of these Sorts, if duly water'd and preserv'd in a kindly Warmth, will grow, in the Compass of one Season, to the Height of eight or nine Feet, and produce great Quantities of Flowers, but unless the *Autumn* proves very favourable, the Seeds do seldom ripen, and the Plant being much tenderer than the other Sorts, is rarely preserv'd through the *Winter*, tho' plac'd in the warmest Stoves, so that we are oblig'd to procure the Seeds from *Abroad*.

The second Sort is of much humbler Growth, seldom rising above two Feet high, but branches out very much, and is beset with Thorns: This will abide two or three Years, if preserv'd in a good Stove, and generally produces Seeds every Year, so that it is now become very common in the *English* Gardens, being the easiest to preserve, and the most plentiful in seeding of all the Sorts.

The third Sort hath very broad Leaves, and is greatly beset with sharp Thorns: This will rise to the Height of five or six Feet, but has generally very slender Branches, and is tenderer than the last-mention'd: It rarely produces Seeds in this Country, but may be preserv'd through the Winter in a very good Stove.

The fourth Sort has the quickest Motion of all the Kinds at present in *England*: This is somewhat like the third in Appearance, but grows more erect, and hath fewer Spines, and the Flowers are of a different Colour. The Seeds of this kind are frequently brought over from *Barbadoes*, where, by the Plenty of Seeds brought over, it seems to be the most common in that Country.

The fifth Sort is preserv'd in Botanick Gardens for Variety, but is a Plant of no great Curiosity: It hath somewhat the Appearance of the first Sort, and will grow erect to the Height of five or six Feet, and produce great Quantities of Seeds; but it having no Motion upon being touch'd, renders it less valuable than the others.

These Plants were most of them thought to be Annuals formerly, because upon the first Approach of cold Weather they were destroy'd; but since the modern Invention of Bark stoves, most of these Sorts have been preserv'd two or three Years, and do produce Seeds very well.

The Stove in which these Plants are placed in *Winter*, should be kept to *Anana's Heat*, (as mark'd on Mr. *Fowler's Thermometers*); and during that Season they should be frequently refresh'd with Water, which must be plac'd in the Stove at least twenty-four Hours before it be us'd, that it may have nearly an equal Warmth to the Air of the Stove; but you must not give it to them in large Quantities, which will rot their Roots, and cause them to decay: You must also observe to pick off all decay'd Leaves which may appear at that Season; which, if not taken off, will harbour Insects, to the great Prejudice of the Plants.

But where there is not the Conveniency of a good Stove to preserve these Plants through the *Winter*, their Seeds may be annually procured, and a few Plants rais'd, which may be kept in a Hot-bed under Glasses, where they will continue until the Cold approaches in *Autumn*, and, being a great Curiosity, are worthy of Care in every good Garden.

The Philosophical Reason of the sudden Motion of this Plant, upon its being touch'd, has not, that I know of, been explain'd by any Person; but I shall here insert what has been advanc'd on that Head.

The Phenomenon thereof is worthy Admiration, that not only in the Evening, or towards Night, but at all Hours of the Day, with the least Touch of a Stick, or gentle one with the Hand, the Leaves, just like a Tree a dying, droop, and complicate themselves with all the Quickness imaginable, and presently after erect and recover themselves, returning to their former Position; so that a

Person would be induc'd to think they were really endow'd with the Sense of Feeling.

This seem'd so hard to be discover'd, that a curious *Malabarian* Philosopher, upon his observing the Nature of this Plant, ran mad; just as *Aristotle* is said to have flung himself headlong into the Sea, because he could not comprehend the Ebbing and Flowing thereof.

The Reason of these Plants thus drooping and reviving again so soon, may be accounted for as follows:

It is occasion'd by the Structure of their Muscles or Fibres, their Nerves, their Valves, and their Pores.

1st, By reason that the interior Nerves which belong to their superior Muscles or Fibres of the Leaves being wider than those exterior which belong to the inferior; and therefore the Vapour ascending out of the Earth through the inferior Nerves, as they are pretty broad, having a large Influence on the upper Fibres of the Leaf, and by reason of the Situation of the Valves cross-wise, not being able to return to the Earth, dilate themselves with respect to their Latitude, and abbreviate them in Longitude, and so erect the Leaves on which these Fibres are inserted, to such a Height, as their Articulation or Flexibility will permit.

Hence it is, that by the Inflation of the superior Muscles, and the Erection of the Leaves, the Breath which is in the inferior Muscles or Fibres of the Leaves, so press'd and so forc'd to open the Valves and Pores out of the narrower Nerves looking into the broader or wider, and then to cross over with the other Spirits in the wider Nerves into the superior Muscles of the Leaves, and raise them upwards; and that so much the more, because the inferior Valves, by their Situation cross-wise, hinder the Descent of the Fumes again into the Ground.

The Spirits then ascending out of the Earth in pretty large Quantities, and pretty strong, through the interior and wider Nerves, do not suffer the Valves, out of the wider Nerves, entering into the narrower, to be open'd, or the Fumes to cross through these out of the wider Nerves into the narrower. When therefore the superior Part of the Leaves are touch'd with the Hand, then the Spirits in those upper Parts of the Leaves being driven more vehemently by that Touch, tend downwards, through the interior and wider Nerves, and by that means open the Valves and Pores, which look from the wider and inward Nerves into the outward and narrower, and, by reason of the Stoppage of the Valves cross-wise, being not able to descend, they ascend through them, and, by their Ascent, shut up the Valves looking from the narrower Nerves into the broader, and so necessarily descend into the inferior Muscles or Fibres of the Leaves, and by inflating them and abbreviating them as to their Length, bend those lower Leaves as much as their Articulation or Flexibility will allow of.

Then,

Then, after those Leaves have been so press'd downwards, and the Hand remov'd from the Plant, the Exhalations out of the Earth ascend into the Stalk in greater Quantities through the inward and wider Nerves, and through the Valves that go cross them through the exterior and narrower, and by that means first shut those Valves which come from the wider and inward Nerves into the exterior, and then proceeding forward, (i. e. the Exhalations) cross over to the superior Muscles of the Leaves; and by inflating those, they somewhat raise the Leaves which were depress'd; and by that small Sublation of the Leaves, press the Exhalations, which the inferior Muscles of the Leaves are full of; and those being press'd, they open the Valves in the narrower Nerves, out of the exterior Nerves into the interior, and so cross over to the wider and inner Nerves; and there, by reason of the Vehemency of Fumes in great Quantities exhaling out of the Earth into them, and closing those Valves, which go into the narrower Nerves, they can neither descend nor cross over to the Sides, but are necessarily terminated in the superior Muscles of the Leaves, by Exhalations perpetually ascending out of the Earth, through the wider Nerves; which Leaves, as their upper Parts are full of copious Exhalations, so they are thereby dilated.

MINT; *vide* *Mentha*.

MIRABILIS PERUVIANA; *vide* *Jalapa*.

MISLETOE; *vide* *Viscum* in the Appendix.

MITELLA, [so call'd, of *Mitella*, Lat. a little Mitre, because the Seed-vessel of this Plant resembles a Bishop's Mitre. Bastard American Sanicle.

The Characters are;

It hath a perennial Root: The Cup of the Flower consists of one Leaf, and is divided into five Parts: The Flower consists of five Leaves, which expand in Form of a Rose: The Ovary becomes a roundish Fruit, which terminates in a Point, gaping at the Top, in Form of a Bishop's Mitre, and full of roundish Seeds.

The Species are;

1. MITELLA; *Americana, florum petalis integris*. Tourn. American Mitella, whose Flower-leaves are intire.

2. MITELLA; *Americana, florum petalis fimbriatis*. Tourn. American Mitella, with fringed Flower Leaves.

3. MITELLA; *Americana, flore squallide purpureo, villosa*. Boer. Ind. American Mitella, with hairy Flowers, of a dirty purple Colour.

These Plants are preserv'd in curious Botanick Gardens for Variety; but there being very little Beauty in their Flowers, they are seldom propagated in Gardens for Pleasure. They are very hardy, and will thrive in almost any Soil or Situation, and may be propagated either from Seeds, or by parting their Roots, which may be done either in Spring or Autumn,

in the manner as is practis'd for *Polyanthus's*, &c. and being planted in a shady Situation, will grow very vigorously; so that, for the Sake of Variety, a few Roots may be admitted in shady Borders where few better Plants will thrive.

MOLDAVICA: [This Plant is so call'd, of *Moldavia*, because it was brought to us from that Country, where it grows without Culture.] Turkey Balm.

The Characters are;

It is a Plant with a labiated Flower, consisting of one Leaf, whose Upper-lip is arch'd, cut into two Parts, and reflex'd: The Under-lip is also divided into two Parts, both ending in border'd Jaws: The Flower-cup is hollow, and generally cut into two unequal Lips, out of which arises the Pointal, attended with four Embryo's, which afterwards become so many oblong Seeds.

The Species are;

1. MOLDAVICA; *betonica folio, flore cæruleo*. Tourn. Turkey Balm, with a Betony Leaf, and a blue Flower.

2. MOLDAVICA; *betonica folio, flore albo*. Tourn. Turkey Balm, with a Betony Leaf, and a white Flower.

3. MOLDAVICA; *betonica folio, flore purpureo-cæruleo*. Tourn. Turkey Balm, with a Betony Leaf, and a purplish blue Flower.

4. MOLDAVICA; *Orientalis, betonica folio, flore magno, violaceo*. T. Cor. Eastern Moldavica, with a Betony Leaf, and a large Violet-colour'd Flower.

5. MOLDAVICA; *Orientalis, salicis folio, flore parvo cæruleo*. T. Cor. Eastern Moldavica, with a Betony Leaf, and a large whitish Flower.

6. MOLDAVICA; *Orientalis, salicis folio, flore parvo cæruleo*. T. Cor. Eastern Moldavica, with a Willow Leaf, and a small blue Flower.

7. MOLDAVICA; *Orientalis, salicis folio, flore parvo albo*. T. Cor. Eastern Moldavica, with a Willow Leaf, and a small white Flower.

8. MOLDAVICA; *Americana, trifolia, odore gravi*. Tourn. Three-leav'd American Moldavica, with a strong Scent, commonly call'd The Balm of Gilead.

The seven first Species are annual Plants, which perish soon after they have perfected Seeds: These may be propagated by sowing their Seeds in March, upon a Bed of fresh light Earth, in a warm Situation; and when the Plants are come up about two Inches high, they should be transplanted into the Borders of the Pleasure-Garden, observing to water 'em until they have taken Root: After which they will require no farther Care but to keep them clear from Weeds; and if they grow pretty tall, to support them with Sticks, to prevent their being broken by Winds.

In June and July they will produce their Flowers; and in August their Seeds will be perfected, when they must be gather'd, and preserv'd dry for the succeeding Spring.

The Seeds may also be sown upon a warm Border in August, where the Plants will come up soon after, and will endure the Cold

Cold of our ordinary Winters very well, provided they have a dry Soil, and a warm Situation.

In the *Spring* they may be transplanted out into the Borders where they are design'd to be continu'd, where they will flower early, and produce good Seeds; whereas it sometimes happens, that if the Season proves cold and wet, those Plants which are sown in the *Spring* do not perfect their Seeds.

There is no very great Beauty in these Plants; but as they require little Culture, so they may be admitted into large Borders of the Flower-Garden, where being intermix'd with other Plants, they afford an agreeable Variety. The most valuable Sorts are the two Oriental Kinds with large Flowers; these commonly grow about eighteen Inches high, and divide into several Branches, but do not take up much Room; and being annual Plants, there will be no Danger of their injuring others that may grow near them.

The eighth Sort is an abiding Plant, which may be easily propagated by planting Cuttings, during any of the *Summer* Months, in a Border of rich Earth, observing to water and shade 'em until they have taken Root, which they do commonly in about three Weeks time; after which they will require no farther Care than only to keep them clear from Weeds, 'till they have made considerable Progress, when they should be taken up, preserving a Ball of Earth to each Plant, and set into Pots fill'd with fresh light Earth, placing them in a shady Situation until they have taken fresh Root; after which, they may be expos'd to the open Air until the Middle or Latter-end of *October*, when they must be remov'd into Shelter, otherwise they will be liable to suffer by hard Frosts: Tho' they should be plac'd where they may enjoy as much free Air as possible in mild Weather, and only require to be protected from severe Cold; for in moderate Winters I have had them endure abroad very well, when planted under a warm Wall.

They will require frequently to be water'd when planted in Pots; but in the *Winter* you should not let 'em have it in great Quantities, which will be apt to rot their Roots, and destroy 'em. This last Species is preserv'd in several Gardens, for its Oddness; and the strong balsamick Scent which the Leaves emit, upon being bruise'd, which gave occasion to many Persons formerly to suppose the *Balm of Gilead* was taken from this Plant.

MOLLE: The Indian Molle, or Mastick Tree.

The Characters are;

It hath pinnated Leaves, like those of the Lentiscus, but are terminated by an odd Lobe; the Flower expands in the Form of a Rose; and the Fruit resembles a Grain of Pepper.

We have but one Species of this Tree in *England*, which is,

MOLLE; *Clus. in Monard.* The Arbor Molle, or Indian Mastick Tree.

W

This Tree is preserved in many curious Gardens in *England*, but rarely produces any Flowers in this Country.

It may be propagated by laying down the tender Branches, which in two Years will take Root, when they may be taken off from the old Plants, and planted into Pots fill'd with fresh, light Earth, observing to water and shade 'em until they have taken Root.

But as it is very difficult to make this Tree grow from Layers, so it will be necessary to slit the Branches when lay'd, which will facilitate their Rooting; and when you cut them off from the old Plants, (which should be done in *April*) if you place the Pots upon a moderate Hot-bed, it will cause them to take Root much sooner, provided you water and shade 'em carefully; but you must observe to let them have Air in Proportion to the Warmth of the Season; and when they have taken fresh Root, you must inure them to the open Air by Degrees, into which they should be removed toward the latter End of *May*, placing 'em in a Situation where they may be defended from violent Winds, in which they may remain until the *October* following, when they must be removed into the Green house, placing them where they may have a great Share of free Air in mild Weather, for they only require to be protected from severe Cold.

This Tree will grow to the Height of seven or eight Feet, but commonly produces its Shoots very irregular, so that it is very difficult to form it to a regular Head, for which Reason it is not so much esteem'd, (except by the Curious in *Botany*) as the *Lentiscus*; but for Variety it may have a Place in all curious Green-houses.

MOLUCCA: [This Plant takes its Name of the *Molucca* Islands, because it was found there.] *Molucca Balm.*

The Characters are;

It is a verticillate Plant with a labiated Flower, consisting of one Leaf, whose upper Lip is hollow, like a Spoon, but the under Lip is cut into three Segments; out of the Flower-cup arises the Pointal, attended, as it were, by four Embryo's, which afterwards turn to so many angular Seeds, which are inclos'd in the Bell-shap'd Calix.

The Species are;

1. **MOLUCCA;** *lævis. Dod.* Smooth *Molucca Balm.*

2. **MOLUCCA;** *spinosa. Dod.* Prickly *Molucca Balm.*

These Plants are annual, seldom abiding after they have perfected their Seeds. They are preserved only in such Gardens where a great Variety of Plants are maintain'd, being Plants of no great Beauty or Use. These may be propagated by sowing their Seeds in *March*, upon a Bed of fresh, light Earth, in an open Situation, where the Plants will come up soon after; and when they are about two Inches high, they must be transplanted out, either into fresh Beds of light Earth, or in the

the Borders of the Pleasure-Garden, placing 'em at two Feet Distance, for their Branches will extend pretty far, if the Soil be rich; and when they have taken Root they will require no farther Care, but only to keep 'em clear from Weeds, and fasten them to Sticks to prevent their being broke by Winds when they advance.

In July these Plants will flower, and if the Season proves warm, their Seeds will be perfected in September, but if the Season be cold and moist, they commonly perish without producing good Seeds in this Country: For which Reason these Plants should be rais'd in Autumn, and preserved through the Winter under a common Frame, and in the Spring transplanted out, as before, when they will flower early, and produce good Seeds.

MOLY: [This Plant is so named of *μολο*, to grieve, or be in Pain, because Homer represents it as good to expel Poison.] Wild Garlic.

The Characters are;

It agrees in every respect with the Garlic, but hath, for the most part, a sweet Scent; and the Flowers are produced in an Umbel.

The Species are;

1. **MOLY**; *latifolium*, *Liliflorum*. C. B. P. Broad-leav'd Moly of Theophrastus.
2. **MOLY**; *latifolium*, *Indicum*. C. B. P. Broad-leav'd Indian Moly.
3. **MOLY**; *latifolium Hispanicum*. C. B. P. Broad-leav'd Spanish Moly with purple Flowers.
4. **MOLY**; *latifolium*, *flavo flore*. H. Eyst. Broad-leav'd yellow Moly.
5. **MOLY**; *angustifolium*, *umbellatum*. C. B. P. Narrow-leav'd Moly, commonly call'd Homer's, or Dioscorides's Moly.
6. **MOLY**; *angustifolium*, *foliis reflexis*. C. B. P. Narrow-leav'd Moly, with reflex'd Leaves, commonly call'd The Serpent Moly.
7. **MOLY**; *moschatum*, *capillaceo folio*. C. B. P. The Sweet Moly of Montpellier, *vulgô*.

There are some other Varieties of this Plant, which are preserv'd in curious Botanick Gardens abroad, but those here mention'd are what I have observed in the English Gardens.

They are all very hardy Plants, and may be easily multiplied by their Off-sets, which they send forth in great Plenty: The best Season to transplant them is in August or September, just after their Leaves decay; for if they are permitted to remain long after, and the Season should prove moist, they will send forth fresh Fibres, when it will be too late to remove 'em, unless they are taken up with Balls of Earth.

They will grow in almost any Soil or Situation, but will thrive best in a light, sandy Soil, and an open Exposure.

They commonly produce their Flowers in May and June, except the Sweet-scented Montpellier kind, which seldom flowers till August, and are pretty Varieties in the large Borders of the Pleasure-Garden, where, being intermix'd with other bulbous-rooted Flowers, they afford an agreeable Variety; but they should not be permitted to remain longer than two

Years before they are transplanted, because they produce a great Number of Off-sets, (especially Homer's Moly) which, if not taken from the old Roots, will starve 'em and cause their Flowers to be very weak.

MOMORDICA: [The Origin of the Name is unknown.] Male Balsam-Apple.

The Characters are;

The Flower consists of one Leaf, is of the expanded, bell-shap'd kind, but so deeply cut, as to appear compos'd of five distinct Leaves: These Flowers are some Male (or barren), others Female, growing upon the Top of the Embryo, which is afterwards chang'd into a Fruit, which is fleshy, and sometimes more or less tapering, and hollow; and when ripe, usually bursts, and casts forth the Seeds with an Elasticity; which Seeds are wrapped up in a membranous Covering, and are, for the most part, indented on their Edges.

The Species are;

1. **MOMORDICA**; *vulgaris*. Tourn. The common Male Balsam-Apple.
2. **MOMORDICA**; *Zeylanica*, *pampinea fronde*, *fructu breviori*. Tourn. Male Balsam-Apple of Ceylon, with Vine-leaves and a short Fruit.
3. **MOMORDICA**; *Zeylanica*, *pampinea fronde*, *fructu longiori*. Tourn. Male Balsam-Apple of Ceylon, with Vine-leaves and a longer Fruit.
4. **MOMORDICA**; *Americana*, *fructu reticulato*, *siccò*. Com. Rar. Male Balsam-Apple, of America, with a dry netted Fruit.

These Plants are all annual, their Seeds must be sown on a Hot-bed the Beginning of March, and when the Plants come up, they should be transplanted out into a fresh Hot-bed, after the Manner of Cucumbers or Melons, putting two Plants of the same kind, under each Light, and the Plants water'd and shaded until they have taken Root; after which they must be treated as Cucumbers, permitting their Branches to extend upon the Ground in the same Manner, and observe to keep them clear from Weeds.

With this Management (provided you do not let them have too much Wet, or expose 'em too much to the open Air) they will produce their Fruit in July, and their Seeds will ripen in August, when you must observe to gather it as soon as you see the Fruit open, otherwise it will be cast abroad, and with difficulty gather'd up again.

These Plants are preserv'd in curious Gardens for the Oddness of their Fruit; but as they take up a great deal of Room in the Hot-beds, requiring frequent Attendance, and being of little Beauty or Use, so they are not much cultivated in England, except in Botanick Gardens for Variety.

MORUS: [of *μυρ*, black, because its Fruit is ordinarily so] The Mulberry-tree.

The Characters are;

It hath large, rough, roundish Leaves; the Male Flowers (or Katkins, which have a Calix consisting of four Leaves) are sometimes produced upon separate Trees, at other times at remote Distances from the Fruit on the same Tree:

Tree: The Fruit is compos'd of several Protuberances, to each of which adhere four small Leaves; the Seeds are roundish, growing singly in each Protuberance.

The Species are;

1. MORUS; *fructu nigro*. C. B. P. The common Black Mulberry.

2. MORUS; *fructu albo*. C. B. P. The White Mulberry.

3. MORUS; *fructu nigro, minori, foliis elegantior laciniatis*. Tourn. The lesser Black Mulberry, with Leaves neatly jagged.

4. MORUS; *fructu albo, minori, ex albo-purpurascente*. Tourn. The small Purplish-white Mulberry.

5. MORUS; *Virginiana, foliis latissimis scarbis, fructu rubro longiori*. Cat. Plant. Hort. The broad-leav'd Virginian Mulberry, with long red Fruit.

6. MORUS; *Virginienfis arbor, Loti arboris instar ramosa, foliis amplissimis*. Pluk. Phyt. The large-leav'd Virginian Mulberry, with blackish Shoots, somewhat like those of the Lote or Nettle-tree.

The first of these Sorts is very common in most Gardens, being planted for the Delicacy of its Fruit: It may be propagated by sowing the Seeds, or by laying down the tender Branches, which in two Years will take Root, and may then be transplanted into the Places where they are to remain. Those Plants which are propagated from Seeds are commonly the most vigorous, and generally make the straightest Stems, but then there is a very great Hazard of their being fruitful; for it often happens, that such Plants are, for the most part, of the *Male* kind, which produce *Katkins*, but seldom have much Fruit; for which Reason, those who are desirous to have fruitful Trees, should always propagate them by Layers from such Trees as do produce plenty of good Fruit. But as the Trees thus rais'd are subject to have crooked, unsightly Stems, so there should be Care taken in the Choice of straight Shoots to make Layers; and when they are transplanted out, they should have straight Stakes fix'd down by each, to which they should be fasten'd as the Shoot is extended, until it comes to the Height you design the Stem; then you may suffer the Branches to extend as they are inclinable, for this Tree should not be often prun'd, but only such Branches should be cut off which shoot cross, and bruise themselves by rubbing against each other, and such as decay should also be cut off.

This Tree delights in a light Soil, not too wet nor over dry, and should have an open Exposure; for if it be planted too near to other Trees or Buildings, so as to be shaded thereby, the Fruit seldom ripens well; though if they are planted in a Situation where they may be defended from the violent *West* and *South-West* Winds, which very often blow down and destroy great Quantities of the Fruit, it will be of great Advantage; but they should always be open to the *East* and *South-East* Sun, which is of great Service in drying up the Moisture which lodges upon the

Surface of their Leaves in the Night, and not only retards the Fruit, but renders it ill-tasted and watry.

The Soil under these Trees should also be every Year well dug and manured, tho' there will scarce any Sort of Plants grow under them; but it is of great Advantage to the Fruit, notwithstanding what may have been said to the contrary.

The *White Mulberry* is commonly cultivated for its Leaves, to feed *Silk-worms*. In *France*, *Italy*, &c. though the *Persians* always make use of the common *Black Mulberry* for that Purpose; and I have been assured by a Gentleman of Honour, who hath made Trial of both Sorts of Leaves, that the Worms fed with those of the Black Sort, produce much better Silk than those fed with the White; but he observes, that the Leaves of the Black Sort should never be given to the Worms, after they have eaten for some time of the White, lest the Worms should burst, which is often the Case when they are thus treated.

The Trees which are design'd to feed *Silk-Worms*, should never be suffer'd to grow tall, but rather kept in a Sort of Hedge, and instead of pulling off the Leaves singly, they should be shear'd off together with their young Branches, which is much sooner done, and not so injurious to the Tree.

This white Sort may be propagated either from Seeds or Layers, as the *Black Mulberry*, and is equally as hardy: There are two or three Varieties of this Tree, which differ in the Shape of their Leaves, Size, and Colour of their Fruit; but as they are of no other Use than for their Leaves, so the strongest shooting and the largest-leav'd Sort should be preferr'd.

The *Large-leav'd Virginian* Sort, with long red Fruit, is at present very scarce in *England*, though it seems to be the common Sort, which grows spontaneously in the Woods of *America*: This may be propagated from Seeds, or by laying down the Branches, as the common Sort; it is very hardy, and will endure the Cold of our Winters in the open Air very well. The Leaves of this kind are very large, and seem to be as proper for feeding of *Silk-Worms* as those of the common Sort; so that if ever the Project of establishing a *Silk Manufactory* in the *West-Indies* should be set on foot, there would be no Occasion of their sending over for *Mulberry-Trees*, as hath been by some propos'd, since they will find a sufficient Quantity in all the Woods of that Country.

The *Large-leav'd Virginian Mulberry* with black Shoots, is still more uncommon than any of the former: There is a large Plant of this kind growing in the Gardens of the Bishop of *London* at *Fulham*, which has been several Years an Inhabitant of that Garden, but has never produced any Fruit, that I could learn, but hath some Years a great Number of *Katkins*, much like those of the *Hazel-Nut*, which occasion'd Mr. Ray to give it the Name of *Corylus*; but it may be one of the *Male* Trees, which never produces Fruit, as it sometimes

times happens in the common Sorts of *Mulberries*, the Leaves being very like those of the *Black Mulberry*, but somewhat larger and rougher.

This Tree has not been propagated yet in this Country, for though it has been budded and grafted upon both the *Black* and *White Mulberries*, yet I can't hear that it hath succeeded upon either; and the Tree being pretty tall, can't be laid down, which is the most likely Method to propagate it: This is very hardy, and will endure the Cold of our Climate in the open Air very well, and is coveted as a Curiosity by such who delight in the Variety of Trees and Shrubs.

MOSS; *vide* Muscus.

MOTHERWORT; *vide* Cardiaca.

MOULD, the Goodness of which may be known by the Sight, Smell, and Touch.

First, by the Sight. Those Moulds that are of a bright *Chestnut* or *Hazelly* Colour are accounted the best; of this Colour are the best Loams, and also the best natural Earth; and this will be the better yet, if it cut like Butter, and does not stick obstinately, but is short, tolerably light, breaking into small Clods, is sweet, will be tempered without crusting or chapping in dry Weather, or turning to Mortar in wet.

The next to that the dark-grey and russet Moulds are accounted the best, the light and dark Ash Colour are reckon'd the worst, such as are usually found on common or heathy Ground; the clear tawney is by no Means to be approved; but that of a yellowish red Colour is accounted the worst of all; this is commonly found in wild and waste Parts of the Country, and, for the most Part, produce nothing but *Goss*, *Furze*, and *Fern*, according as their Bottoms are more or less of a light and sandy, or of a spewy Gravel or clayey Nature.

Secondly, by the Smell. All Lands that are good and wholesome, will, after Rain or breaking up by the Spade, emit a good Smell.

Thirdly, by the Touch. By this Means we may discover whether it consists of Substances intirely arenaceous or clammy, or, according as it is express'd by Mr. Evelyn, whether it be tender, fatty, deterfive, or slippery, or more harsh, gritty, porous, or friable.

That being always the best that is between the two Extrems, and does not contain the two different Qualities of soft and hard mix'd, of moist and dry, of churlish and mild, that is, neither too unctuous or too lean, but such as will easily dissolve; of a just Consistence, between Sand and Clay, and such as will not stick to the Spade or Fingers upon every Flash of Rain.

A Loam or Brick Mould is not to be disapprov'd, as requiring little Help or Improvement but the Spade, and is esteemed both by the Gardener and Florist.

MUCILAGE, is a viscous, clammy Substance about Seeds, &c.

MUCILAGINOUS, signifies, endow'd with a clammy, viscous Matter.

MULBERRY; *vide* Morus.

MULLEIN; *vide* Verbascum.

MULTISILIQUEOUS Plants, are such as have after each Flower many distinct, long, slender, and, many times, crooked Cases or *Siliques*, in which their Seed is contain'd; and which, when they ripen, open of themselves, and let the Seeds drop. Of this Kind is the *Bear's-foot*, *Columbines*, common *Houfeseek*, *Navet-wort*, *Orpine*, &c.

MUMMY, a sort of Grafting-wax, made of one Pound of common Black Pitch and a quarter of a Pound of common Turpentine, put into an earthen Pot and set on the Fire in the open Air; in doing this you ought to hold a Cover in your Hand, ready to cover it, in order to quench it, by putting it thereon, which is to be done several times, setting it on the Fire again, that the nitrous and volatile Parts may be evaporated. The Way to know when it is enough, is, by pouring a little of it upon a Pewter Plate, and if it be so, it will coagulate presently; then this melted Pitch is to be poured into another Pot, and a little common Wax is to be added to it, mixing them well together; and then to be kept for Use.

Dr. Agricola directs the using this Mummy as follows:

When you would dress Roots with this Wax, you must melt it, and afterwards let it cool a little, then dip in the Ends of the Pieces of the Roots you would plant (for he proposes it for the Planting of Pieces of Roots of Trees, &c.) one after the other, but not too deep, and afterwards to put them in Water, and to plant them in the Earth, the small End downwards, so that the larger End may appear a little Way out thereof, and have the Benefit of the Air; and then to press the Earth very hard down about them, that they may not receive too much Wet, because that would rot them.

Mummy for Exotick Plants: The same Author directs the Making it as follows:

Take half a Pound of Gum-Copal, beat it very fine, and searfe it; take three Pounds of Venice Turpentine, and melt it over a slow Fire in a strong earthen Pot; when the Turpentine is melted and liquidated, put the sifted Gum into it, keep it continually stirring with a little Stick, augmenting the Fire gradually, and it will all dissolve insensibly; afterwards let the Turpentine evaporate well, and it will thicken; and when it is become of a sufficient Consistence, you may make it up into little Rolls, like Sealing-Wax, and keep it for Use.

This Mummy, he says, is an excellent Vulnerary for Plants, it being subject to no Corruption, as other gummy Things are; it hinders any Rottenness between the Stock and the Root, by means of which the Callus is form'd

form'd the sooner, and spreads over all the Parts, and the Stock becomes intirely connected with the Root. It also gives Strength and Vigour to the Root, and likewise facilitates it.

Vegetable Mummy: The same Author directs the Making of this as follows:

Fill a large Kettle or earthen Pot about a third Part full of common Black Pitch, and add to it a little fine Rosin, or sulphurated Pitch, and a little yellow Wax; melt these together 'till they become liquid, then take them off the Fire, and let them stand 'till they have done smoaking, and when cool you may, with a Brush, plaister the Incisions which are made for Inoculation, Grafting, &c.

Garden or Forest Mummy: The same Author directs the making it as follows:

Take three Pounds of common Turpentine, and four Pounds of common Pitch, melt the Turpentine over the Fire, and having beaten the Pitch to a Powder, throw it in; when they are well mix'd together, and grown pretty thick, take it off and keep it for Use.

This Composition may be either made up into little Sticks, like those of Sealing-Wax, to be made use of on little Trees, or it may be kept in little Pots, and melted over a slow Fire, when there is Occasion to use it; and dipping a little Brush in it you may plaister the Graft.

The Noble Mummy, or Grafting Wax: To make this the same Author directs:

Take two Pounds of pure Pitch, such as is call'd at *Ratisbonne*, *Virgin Pitch*, and add to it half a Pound of good Turpentine; put them together in an earthen Pot, and set them over the Fire, that the volatile Part of the Turpentine may evaporate, otherwise it would be very prejudicial to Trees and Roots: Prove it as you did the former, to know when it is enough, then add to it half a Pound of *Virgin-Wax*, and half an Ounce of pounded *Myrrh* and *Aloes*; when these are well mix'd, make it up into little Rolls, or Plaisters, or else it may be kept in Gally-pots.

The Time he directs when the Operation of the Roots is to be perform'd, is in the Months of *September*, *October*, and *November*, though it may succeed well at any Time of the Year, yet those Months are the most proper Seasons for it. The only Difference, he says, is, what is planted in the *Spring* will shoot out in *June* or *July*, and what is planted in *Autumn* comes not forth 'till the Month of *April*.

The aforesaid Author mentions great Performances by using these *Mummies*; those who have a Mind to be satisfied may peruse his *Treatise*.

MUSA: The Plantain-Tree.

The Characters are;

Musa is a kind of Plant with a polypetalous, anomalous Flower; the upper Petal is excavated or hollowed like a little Boat, and divided into three at the Summit; the hinder one is con-

cave, but the inward one peltated, or in the Form of a Crescent or Half-moon Shield, and accompanied with two little narrow-pointed Leaves: The Calix passes into a cucumber-shap'd Fruit, that is soft, fleshy, covered with a Skin, divided, as it were, into three Locuments, in which there appear, as it were, some Rudiments of Seeds.

The Species are;

1. *MUSA*; fructu cucumerino, longiori. *Plum. Nov. Gen.* The Plantain-tree, vulg.
2. *MUSA*; candice maculato, fructu recto, rotundo, brevior, odorato. *Sloan. Cat.* The Banana-tree, vulg.

These Plants are very common in the *East* and *West-Indies*, as also in most hot Countries of the World. They are carefully cultivated by the Planters in the *West-Indies*, who plant 'em in low, rich Ground, by the Sides of Gulches, where they produce Fruit most Parts of the Year. In *England* they are only preserved as Curiosities, where they must be constantly kept in a Bark-Stove; for though they may be kept alive in another warm Stove, yet they will make very little Progress therein, and do not appear half so beautiful, their chief Ornament being the Largeness of their Leaves, which are sometimes four Feet long, and near two Feet broad; but as these Plants take up a great deal of Room in the Stove, especially when they arrive to a considerable Size, so it is not convenient to keep more than one Plant of each kind.

During the Summer Season these Plants must be plentifully water'd, for the Surface of their Leaves being large, occasions a great Consumption of Moisture, by Perspiration, in hot Weather; but in the *Winter* they must be water'd more sparingly, though at that Season they must be often refresh'd, but it must not be given 'em in such Quantities.

The Pots in which these Plants are placed should be large, in proportion to the Size of the Plants, for their Roots generally extend pretty far; and the Earth should be rich and light. The Degree of Heat with which these Plants thrive best, is much the same with the *Anana*, or *Pine-Apple*, in which I have seen this Plant seven or eight Feet high, but never could observe any Tendency to produce Fruit, nor do I believe it possible to bring the Fruit of this Plant to any tolerable Perfection in *England*, the Plant requiring a great deal more Room and Height than our Stoves at present will admit, as also a greater Share of Air than can be given to 'em in *Winter* in this Country.

These Plants are easily propagated, by cutting off an old Plant near the Ground, which will occasion their shooting out several young ones from the Root; which is the Manner they are propagated in the hot Countries; so that after a Spot of Ground is once planted with 'em, they will continue several Years; for the old Plant producing one large Bunch of Fruit from the Center, when that is ripe and cut off, the whole Plant decays, and several young ones spring up from the Roots, which

which being produced one after another, successively, affords the Inhabitants Plants of various Size and Age, which produce their Fruit successively, in like manner.

It is the first of these *Species* which is chiefly cultivated in the *West-Indies*, that producing a much larger Bunch of Fruit, is by the Inhabitants greatly prefer'd to the other, which is accounted a very pleasant Fruit, when ripe, and is by many Persons greatly coveted by way of Desert, being softer and more luscious to the Taste, but is not so much esteem'd for Food.

These Plants do rise to be fifteen or twenty Feet high in the *West-Indies*, to which Height they generally arrive in about ten Months from their first planting, soon after which they produce their Fruit, and then decay: They are of the quickest Growth of any Vegetable yet known. Sir *Hans Sloane* says, one may almost see them grow; he cut a young Tree even at the Top with a Knife, which immediately grew up discernably, and in an Hour's Time the middle Leaves, which were wrapped up within the others, were advanced above them half an Inch.

MUSCARI: *Musk, or Grape Hyacinth; vulgô.*

The Characters are;

It hath a bulbous Root, the Leaves are long and narrow, the Flower is hermaphroditical, consisting of one Leaf, and shap'd like a Pitcher, and cut at Top into six Segments which are reflex'd; the Ovary becomes a triangular Fruit, divided into three Cells, which are full of round Seeds.

The Species are;

1. **MUSCARI;** *arvense, juncifolium, minus, cœruleum. Tourn.* Common lesser blue Grape-flower, or Muscary.

2. **MUSCARI;** *arvense, juncifolium, exalbidum, minus. Tourn.* Lesser whitish Grape-flower, or Muscary.

3. **MUSCARI;** *obsoletiore flore, ex purpurâ virente. Clus.* Musk Hyacinth or Grape-flower, of a worn out purple-greenish Colour.

4. **MUSCARI;** *cœruleum, majus. Tourn.* Greater blue Muscary or Grape-flower.

5. **MUSCARI;** *arvense, latifolium, purpurascens. Tourn.* Broad-leav'd Muscary or Grape-flower, with a purplish Flower.

6. **MUSCARI;** *paniculâ, comosâ, purpurâ-violaceâ. Boerb. Ind.* The feather'd Hyacinth; *vulgô.*

There are some other Varieties of this Plant which are preserv'd in the curious Flower-Gardens in *Holland* and *Flanders*, but those here mention'd are what I have observ'd in the *English* Gardens.

The first Sort is very common in most old Gardens, where, by its plentiful Increase, it is become so troublesome as to render it little esteem'd; for when once these Roots have taken Possession of a Garden, they are scarcely ever eradicated afterward; the smallest Off-sets growing, although they are buried a Foot under the Surface of the Ground. This pro-

duces its Flowers in *April* and *May*, and if permitted to remain, will produce ripe Seeds in *June*.

The second Sort is less common than the first, and is preserv'd by such who are curious in Flowers, though it is a Plant of no great Beauty; this is propagated by Off-sets, as the common *Hyacinth*, and will thrive in almost any Soil or Situation, but best in that which is warm and dry.

The third Sort is a very despicable Flower, to Appearance, but is chiefly preserv'd for its uncommon Sweetness; this is also increas'd as the former, and produces its Flowers much about the same Season.

The fourth, fifth, and six Sorts are also preserv'd in curious Gardens for Variety, but neither of these have much Sweetness in their Flowers; these are also propagated by Off-sets as the former, but produce their Flowers later in the Season.

The proper Season for taking up the Roots of these Flowers is in *June*, when their Leaves are decay'd; at which Time they should be spread upon Mats, in a dry Place, for a Fortnight, until their Bulbs be dry'd, when they may be laid up, each Sort by it self, until the Beginning of *October*, which is the Season for Planting most of those bulbous-rooted Flowers; and the various Sorts of these may then be intermix'd amongst other Flowers of the same Growth, where, in the Season of their Flowering, they afford an agreeable Variety. These Roots should never be permitted to remain longer than two Years unremoved, for they multiply so fast, that the Number of their Off-sets would greatly weaken the blowing Roots, and cause their Flowers to be very small; and the first Sort, which increases so plentifully, would fill the Borders with Off-sets, so as not to be clear'd out again.

MUSCIPULA; *vide* *Lychnis*.

MUSCOSE, MUSCOSUS; Mossy, or abounding with Moss.

MUSCOSITY; Mossiness.

MUSCUS; Moss.

These, though formerly suppos'd to be only Excrescencies produced from the Earth, Trees, &c. yet are no less perfect Plants than those of greater Magnitude, having Roots, Branches, Flowers, and Seeds, but yet cannot be propagated from the latter by any Art.

The Botanists distinguish these into several Genera, under each of which are several Species; but as they are Plants of no Use or Beauty, so it would be to no purpose to enumerate them in this Place.

These Plants chiefly flourish in cold Countries, and in the Winter Season, and are many times very injurious to Fruit-trees, which grow upon cold, barren Soils, or where they are so close planted as to exclude the free Access of Air: The only Remedy in such Cases is to cut down Part of the Trees, and plough up the Ground between those left remaining, and in the Spring of the Year, in moist Weather, you should, with an iron Instrument made a

little hollow, the better to surround the Branches of the Trees, scrape off the Moss, carrying it off the Place; and by two or three times thus cleaning them, together with carefully stirring the Ground, it may be entirely destroy'd from the Trees: But if you do not cut down part of the Trees, and stir the Ground well, the rubbing off the Moss will signify little, for the Cause not being remov'd, the Effect will not cease, but the Moss will, in a short Time, be as troublesome as ever.

MUSHROOMS; are, by many Persons, suppos'd to be produc'd from the Putrefaction of the Dung, Earth, &c. in which they are found; but notwithstanding this Notion is pretty generally received amongst the unthinking Part of Mankind, yet, by the curious Naturalists, they are esteem'd perfect Plants, though their Flowers and Seeds have not, as yet, been discover'd. But since they may, and are annually propagated by the Gardeners near London, and are (the esculent Sort of them) greatly esteem'd, by most curious Palates, so I shall briefly set down the Method practis'd by the Gardeners who cultivate them for Sale.

But, first, it will not be improper to give a short Description of the true eatable Kind, since there are several unwholesome Sorts which have been, by unskilful Persons, gather'd for the Table.

The true *Champignon*, or *Mushroom*, appears at first of a roundish Form, like a Button, the upper Part of which, as also the Stalk, is very white, but being open'd, the under Part is of a livid Flesh-colour, but the fleshy Part, when broken, is very white: when these are suffer'd to remain undisturb'd, they will grow to a large Size, and explicate themselves almost to a Flatness, and the red Part underneath will change to a dark Colour.

In order to cultivate them, if you have no Beds in your own, or in neighbouring Gardens, which produce them, you should look abroad in rich Pastures, during the Months of *August* and *September*, until you find 'em (that being the Season when they are produced) then you should open the Ground about the Roots of the *Mushrooms*, where you will find the Earth, very often, full of small white Knobs, which are the Off-sets or young *Mushrooms*; these should be carefully gather'd, preserving them in Lumps with the Earth about them; then being provided with a Parcel of new Horse-dung, you should shake out the Litter, if there be any amongst it, and cast it up into a Heap, for seven or eight Days, to heat; then you should dig a Trench about three Feet wide, and in Length, according to the Quantity of *Mushrooms* required, or the Plenty of Earth you can procure for that Purpose, into which you should lay the Dung about a Foot thick, covering it over with light rich Earth, about six or eight Inches, into which, on each Side, you should put in some of the Knobs of *Mushroom* Earth, about six Inches asunder.

Then make another Layer of Dung upon this Earth, as before, about eight or ten Inches thick, observing to draw in the Sides, so as not to bury the Knobs of *Mushroom* Earth above half an Inch; then put another Laying of Earth, placing some Knobs on the Sides, as before, and put a third Laying of Dung thereon, still drawing it in narrower, and cover this with Earth, so as to bring it to a Ridge, still placing some Knobs of the *Mushroom* Earth into the Sides, all the Way up; then cover the Bed all over with dry Litter, about half a Foot thick, to prevent the Earth from drying too fast, as also to keep out the Wet, if there should happen to be Rain; and this Litter will retain the moist Vapour which arises from the Fermentation of the Dung, and is of great Service in promoting the Growth of the *Mushrooms*; for it is observed, that too much Drowth or over Moisture is destructive to them, but a *Medium* between both is absolutely necessary for their Production.

When your Bed has been made a Week, you must carefully look over it, (by drawing off the Litter with your Hands) to see if the *Mushrooms* begin to appear; for if they are permitted to remain long in the Bed after they are large enough for Use, they will rot, and infect all the young Spawn, or Off-sets, so that all that Part of the Bed where they rot, will be entirely spoil'd. After they once begin to produce, the Bed must be diligently search'd every Day, during their chief Season of Growth, which is commonly in *August* and *September*, but at other Times, every other Day, in order to gather all such as are fit for Use; in doing of which you should pull them gently out of the Ground, so that no Part of their Stems be left behind, which will engender Worms, whereby the young Spawn will be destroy'd; but if in pulling them up, there should any of the Spawn adhere to their Roots, that should be gently taken off, being careful not to bruise it, and thrust into the Bed again, where it will soon fix.

As the Cold increases in *Autumn*, so you should increase the Quantity of your Litter over the Beds, to preserve 'em from that and Wet, which, if not guarded against, will soon retard the Growth of the *Mushrooms*, and spoil the Beds for a future Crop.

A Bed thus manag'd, if the Spawn takes kindly, will continue good for several Months, and produce great Quantities of *Mushrooms*; from these Beds you take the Spawn for a fresh Supply, which may be laid up in a dry Place until the proper Season of using it, which is toward the latter End of *July* or the Beginning of *August*, and it will be the better for the Purpose, if kept dry three or four Months, as I have experienced; nay, I have had it succeed extremely well, after having been kept in a warm dry Place above six Months.

MUSTARD; *vide* Sinapi.

MYOSOTIS

MYOSOTIS: [of *μῦς*, a Mouse, and *ὅτι*, an Ear.] Mouse-ear Chickweed.

The Characters are ;

It hath the whole Appearance of Chickweed ; but the Flower is larger, and the Fruit is shap'd like an Ox's-horn, gaping at the Top, and full of small round Seeds.

The Species are ;

1. **MYOSOTIS** ; *Hispanica, segetum*. Tourn. Spanish Corn Mouse-ear Chickweed.

2. **MYOSOTIS** ; *Alpina, latifolia*. Tourn. Broad-leav'd Mouse-ear Chickweed of the Alps.

3. **MYOSOTIS** ; *Orientalis, perfoliata, folio lychnidis*. Flor. Eastern Thorough-wax, Mouse-ear Chickweed, with a Champion Leaf.

There are several other Varieties of this Plant, which are preserved in curious Botanick Gardens ; but as they are of little Beauty or Use, so I shall omit mentioning them in this Place. These may be propagated by sowing their Seeds in March, upon a Bed of light fresh Earth, in an open Situation, where they may remain to flower and seed, being careful to clear them from Weeds, as also to pull up the Plants, where they come up too thick ; but they do not succeed well if transplanted, so that they should always remain where they are sown.

MYRRHIS ; [is so call'd, because it has the Scent of Myrrh.] Sweet Cicely.

The Characters are ;

It is an umbeliferous Plant, with a Rose-shap'd Flower, consisting of several unequal Petals, or Flower Leaves, that are placed circularly, and rest upon the Empalement ; which turns to a Fruit, compos'd of two Seeds, resembling a Bird's-bill, channell'd and gibbous on one Side, but plain on the other.

The Species are ;

1. **MYRRHIS** ; *magno semine, longo sulcato*. J. B. Sweet Cicely, or Great Sweet Chervil, and by some Sweet Fern.

2. **MYRRHIS** ; *annua, semine striato, villoso, incano*. M. Umb. Annual Sweet Cicely, with hairy striated Seeds, by some call'd Candy Carrot.

3. **MYRRHIS** ; *Orientalis, folio angustiori peucedani, semine villoso*. Boerb. Ind. Eastern Sweet Cicely, with a narrow Sulphur-wort Leaf and hairy Seeds, or the True Candy Carrot.

There are many more Sorts of this Plant preserved in the Gardens of such as are curious in Botany, but as they are Plants of little Use or Beauty, so I thought it not necessary to enumerate 'em in this Place.

The first mention'd is an abiding Plant, which is sometimes used in Medicine : This may be propagated by sowing the Seeds in February, upon a Bed of light rich Earth, in a shady Situation ; and when the Plants come up, they should be transplanted out into the like rich Earth, in a moist shady Situation, at about two Feet asunder, for they spread very wide, and take up much Room, (especially if they are permitted to remain two or

three Years unremoved) ; after the Plants have taken Root they will require no further Care, but to keep 'em clear from Weeds, and they will endure several Years, and produce great Quantities of Seeds, by which, as also by parting the old Roots, they may be greatly increas'd.

The Seeds of the second Sort are most commonly sold in the Shops for those of the *Daucus Creticus* ; but it is the third Sort which is generally accounted the true *Daucus Creticus* : The Seeds of which are us'd in some of the capital Medicines of the Shops.

These may be propagated by sowing their Seeds in the Spring upon a Border of light Earth, expos'd to the Morning-Sun, in which the Plants will rise in about six Weeks after ; when they may be transplanted out into Beds of light Earth, observing to water and shade them until they have taken Root ; after which they will require no farther Care but only to keep them clear from Weeds : The Summer following these Plants will produce Flowers and Seeds ; soon after which, the second Sort will decay ; but the third will sometimes abide two or three Years, and produce Seeds annually.

MYRTUS ; [according to some Authors, was so call'd on account of the Likeness of its Scent to that of Myrrh ; but others will have it derive its Name of Myrrha, an Athenian Damsel, with whom Pallas being enamour'd, after her Death is said to have transform'd her into this Tree.] The Myrtle.

The Characters are ;

The Flower consists of several Leaves dispos'd in a circular Order, which expand in Form of a Rose ; upon the Top of the Footstalk is the Ovary, which has a short Star-like Cup, divided at the Top into five Parts, and expanded ; the Ovary becomes an oblong umbilicated Fruit, divided into three Cells, which are full of Kidney-shap'd Seeds.

The Species are ;

1. **MYRTUS** ; *communis, Italica*. C. B. P. Common Myrtle, with pretty large Leaves.

2. **MYRTUS** ; *latifolia, Romana*. C. B. P. Common Broad-leav'd Myrtle.

3. **MYRTUS** ; *minor, vulgaris*. C. B. P. Thyme-leav'd Myrtle ; vulgô.

4. **MYRTUS** ; *folio Buxi*. Schuyt. Boerb. Ind. Box-leav'd Myrtle ; vulgô.

5. **MYRTUS** ; *foliis minimis & mucronatis*. C. B. P. Rosemary-leav'd Myrtle ; vulgô.

6. **MYRTUS** ; *flore pleno*. Corn. Double-flowering Myrtle ; vulgô.

7. **MYRTUS** ; *foliis odore Nucis Moschatae, cauliculis rubentibus, vulgô odore Citri*. Schuyt. Boerb. Ind. The Nutmeg Myrtle ; vulgô.

8. **MYRTUS** ; *Bætica, angustifolia*. Clus. Narrow-leav'd Spanish Myrtle, commonly call'd The Upright Myrtle.

9. **MYRTUS** ; *balsamica, foliis Mali Granatæ*. H. L. The Pomegranate-leav'd Myrtle.

10. **MYRTUS** ; *latifolia Bætica secunda, vel foliis Laurinis confertim nascentibus*. C. B. P. The Orange-leav'd Myrtle ; vulgô.

11. **MYRTUS** ;

11. MYRTUS; *minor, foliis ex albo variegatis.* The Strip'd Thyme-leav'd Myrtle.

12. MYRTUS; *foliis odore Nucis Moschatae, cauliculis rubentibus, foliis ex luteo variegatis.* The Strip'd Nutmeg Myrtle; vulgò.

13. MYRTUS; *foliis mucronatis, ex albo & viridi variegatis, flosculis rubro candidis.* Boerb. Ind. The Strip'd Thyme-leav'd Myrtle; vulgò.

14. MYRTUS; *latifolia, Romana, foliis ex luteo variegatis.* The Broad-leav'd Myrtle, with strip'd Leaves.

There are some other Varieties of these Plants which are preserv'd in the Gardens of the Curious, but those here mention'd are what I have observ'd in the Gardens near London.

These Plants may be all propagated from Cuttings; the best Season for which is in July, when you should make Choice of some of the straightest and most vigorous young Shoots, which should be about six or eight Inches long, and the Leaves on the Lower Part must be stripp'd off about two Inches high, and the Part twisted which is to be plac'd in the Ground: Then having fill'd a Parcel of Pots (in Proportion to the Quantity of Cuttings design'd) with light rich Earth, you should plant the Cuttings therein at about two Inches Distance from each other, observing to close the Earth fast about them, and give them some Water to settle it to the Cuttings; then place the Pots under a common Hot-bed Frame, plunging them either into some old Dung or Tanners-Bark, which will prevent the Earth from drying too fast; but you must carefully shade them with Mats in the Heat of the Day, and give 'em Air in Proportion to the Warmth of the Season, not forgetting to water them every two or three Days, as you shall find the Earth in the Pots require it: With this Management, in about a Month's time, the Cuttings will be rooted, and begin to shoot; when you must inure 'em to the open Air by degrees, into which they should be remov'd towards the latter End of August, placing them in a Situation where they may be shelter'd from cold Winds, in which Place they may remain till October; when the Pots should be remov'd into the Green-house, but should be plac'd in the coolest Part thereof, that they may have Air given to them whenever the Weather is mild, for they require only to be protected from severe Cold, except the *Orange-leav'd* and the strip'd *Nutmeg Myrtles*, which are somewhat tenderer than the rest, and should have a warmer Situation.

During the Winter-season they must be frequently water'd, and if any decay'd Leaves appear they should be constantly pick'd off, as also the Pots kept clear from Weeds, which if permitted to grow, will soon overspread the young Plants and destroy them.

The March following these Plants should be taken out of the Pots very carefully, preserv-ing a Ball of Earth to the Roots of each of them, and every one should be placed into a separate small Pot fill'd with rich light Earth, observing to water them well to settle the Earth

to their Roots, and place them in the shady Part of the Green-house until they have taken Root, after which they should be inur'd to the Sun and Air; and in May they must be expos'd to the open Air, observing to place them near Hedges, where they may be defended from strong Winds.

During the Summer-season they will require to be plentifully water'd, especially being in such small Pots, which in that Season soon dries, therefore you should observe to place them where they may have only the Morning-Sun, for when they are too much expos'd to the Sun in the Heat of the Day, the Moisture contain'd in the Earth of those small Pots will soon be exhal'd, and the Plants greatly retarded in their Growth thereby.

In August following you should examine your Pots, to see if the Roots of the Plants have not made Way out through the Hole in the Bottom of the Pots; which if you observe, you must then shift them into Pots a Size bigger, filling them up with the like rich Earth, and observe to trim the Roots which were matted to the Side of the Pots, as also to loosen the Earth from the Outside of the Ball with your Hands, some of which should be taken off, that the Roots may the easier find Passage into the fresh Earth; then you must water them well, and place the Pots in a Situation where they may be defended from strong Winds: And at this time you may trim the Plants, in order to reduce them to a regular Figure; and if they are inclinable to make crooked Stems, you should thrust down a slender strait Stick close by them, to which their Stems should be fasten'd, so as to bring 'em upright.

If Care be taken to train them thus while they are young, the Stems afterwards, when they have acquired Strength, will continue strait without any Support, and their Branches may be prun'd, so as to form either Balls or Pyramids; which for such Plants as are preserv'd in the Green-house, and require to be kept in small Compass, is the best Method to have them handsome: But then these sheer'd Plants will not produce any Flowers; for which Reason that Sort with double Flowers should not be clipp'd, because the chief Beauty of that consists in its Flowers: But it will be necessary to suffer a Plant or two of each Kind to grow rude, for the Use of their Branches in Nosegays, &c. for it will greatly deface those which have been constantly sheer'd to cut off their Branches.

As these Plants advance in Stature, so they should annually be remov'd into larger Pots, according to the Size of their Roots, but you must be careful not to put them in Pots too large, which will cause them to shoot weak and straggling, and many times proves the Destruction of them; therefore when they are taken out of the former Pots, the Earth about their Roots should be pared off, and that within-side the Ball must be gently loosen'd, that the Roots may not be too closely confin'd; and then place them into the same Pots again, provided they are not too small, filling up the Sides

Sides and Bottom of them with fresh rich Earth, and giving them plenty of Water to settle the Earth to their Roots, which should be frequently repeated, for they require to be often water'd both in Winter and Summer; but in hot Weather they must have it in Plenty.

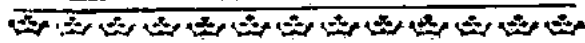
The best Season for shifting these Plants, is either in *April* or *August*, for if it be done much sooner in the Spring, the Plants are then in a slow growing State, and so not capable to strike out fresh Roots again very soon: And if it be done later in *Autumn*, the cold Weather coming on will prevent their taking Root; nor is it adviseable to do it in the great Heat of *Summer*, because they will require to be very often water'd, and also to be plac'd in the Shade, otherwise they will be liable to miscarry: And that being the Season when these Plants should be plac'd amongst other Exoticks to adorn the several Parts of the Garden, these Plants being then remov'd, could not be expos'd until they have taken Root again, which at that time (if the Season be hot and dry) will be three Weeks or a Month.

In *October*, when the Nights begin to have Frosts, you should remove the Plants into the Green-house; but if the Weather proves favourable in *Autumn*, (as it often happens) they may remain abroad until the Beginning of *November*; for if they are carry'd into the Green-house too soon, and the *Autumn* should prove warm, they will make fresh Shoots at that Season, which will be weak, and often decay in Winter, if the Weather should be severe, whereby they will be greatly defac'd; for which Reason they should always be kept as long abroad as the Season will permit, and remov'd out again in the *Spring* before they shoot out; and during the Winter-season that they are in the Green-house, they should have as much free Air as possible when the Weather is mild.

The two first mention'd Sorts I have seen planted abroad in warm Situations, and upon a dry Soil, where they have endured the Cold of Winters for several Years very well, with only being cover'd in very hard Frosts with two or three Mats, and the Surface of the Ground about their Roots cover'd with a little Mulch to prevent the Frost from entering the Ground: But in *Cornwall* and *Devonshire*, where the Winters are more favourable than in most other Parts of *England*, there are large Hedges of *Myrtle* which have been planted several Years, and are very thriving and vigorous, some of which are upward of six Feet high; and I believe if the Double-flowering Kind were planted abroad, it would endure the Cold as well as any of the other Sorts, it being a Native of the Southern Parts of *France*. This and the *Orange leav'd* Kind, are the most difficult to take Root from Cuttings; but if they are planted toward the latter end of *July*, making Choice of only such Shoots as are tender, and the Pots be plung'd into an old Bed of Tanners Bark which has lost most of its Heat, and the Glasses shaded every Day, they will take Root extremely well, as I have

more than once experienc'd. The *Orange-leav'd* Sort, and those with variegated Leaves are somewhat tenderer than the ordinary Sorts, and should be hous'd a little sooner in *Autumn*, and plac'd farther from the Windows of the Green-house.

MYRTUS BRABANTICA; vide Gale.



N A

NAPELLUS; vide Aconitum.

NAPUS; The Navew or French Turnip.

The Characters are;

It agrees in most respects with the Turnip, but hath a lesser Root, and somewhat warmer to the Taste.

The Species are;

1. NAPUS; *sativa*, radice alba. C. B. P. Garden Navew, with a white Root.
2. NAPUS; *sativa*, radice nigra. C. B. P. Garden Navew, with a black Root.
3. NAPUS; *sylvestris*. C. B. P. Wild Navew.

The two first Species of this Plant are cultivated in *France*, *Italy*, and *Germany*, in great Abundance; in which Places they are much prefer'd to common Turnips, being accounted a more delicious Food; but in *England* they have not yet so much obtain'd, being only cultivated by some curious Persons, and are but rarely brought to the Markets.

These Plants may be cultivated by sowing their Seeds in *June*, *July*, and *August*, after the same manner as is practis'd for common Turnips; and when the Plants are come up, they should be hoed in the like manner to destroy the Weeds, and cut up the Plants where they come up too thick, with this Difference only, viz. that these may be left closer together than common Turnips, for neither their Leaves nor Roots do grow near so large: The Plants being thus clear'd from Weeds, and cut up where they are too thick, will require no farther Care until they are fit for Use, which (if the Season proves favourable) will be in about two Months after they are sown, when they must be drawn up, and treated as common Turnips. The wild Sort is pretty common upon dry Banks in most Parts of *England*, where it flowers early in the *Spring*, but is never cultivated in Gardens; but in the Isle of *Ely* it is very much cultivated, it being the Cole Seed from which they draw an Oyl: The Seeds of this Kind are us'd in Medicine, and by most prefer'd to those of the Garden Sort.

NARCISSO-LEUCOJUM; [This Plant is so call'd because it resembles both the *Narcissus* and *Leucojum*.] The Snow-drop; vulg.

The Characters are;

The Flower is for the most part compos'd of six Leaves in form of a Lily, which are sometimes equal, and sometimes unequal and pendulous:

ious: The Empalement becomes a roundish Fruit, which is divided into three Cells, and full of roundish Seeds: To which may be added, It hath a bulbous Root.

The Species are;

1. NARCISSO-LEUCOJUM; *trifolium, minus*. Tourn. Lesser Bulbous-violet or Snow-drop.
2. NARCISSO-LEUCOJUM; *vulgare*. Tourn. Common Bulbous-violet or Snow-drop.
3. NARCISSO-LEUCOJUM; *trifolium, minus, flore pleno*. Boerb. Ind. The Double Snow-drop.
4. NARCISSO-LEUCOJUM; *trifolium, majus*. Tourn. Greater Snow-drop or Bulbous-violet.
5. NARCISSO-LEUCOJUM; *altissimum, flore parvo albo, apicibus viridibus*. Boerb. Ind. The tallest Snow-drop, with small white Flowers tipped with Green.

The first of these Plants is very common in most English Gardens, where it is preserv'd for its early flowering, which is generally in January, when they often appear, though the Ground at that time be cover'd with Snow, and is one of the first Ushers in of the Spring.

This Plant is very easily propagated from Off-sets, which the Roots send forth in great Plenty, (especially if they are permitted to remain undisturb'd for two or three Years) in which time, from a single Bulb, there will often be ten or twelve flowering Roots, and as many more small Off-sets.

The best Season for transplanting the Roots is in May, after their Leaves are decay'd, when they must be taken up; and after being dry'd in a shady Place, they may be kept out of the Ground until September before they need be planted again; when they should be planted about two Inches deep, and pretty close together, otherwise their Flowers being small, will make but a poor Appearance.

They will thrive in almost any Soil or Situation, but are commonly planted near Hedges, and by the Sides of large Walks; where being permitted to remain two or three Years unmov'd, till they have increas'd, and become large Bunches, they make a very good Appearance before any other Flowers come up.

The Double Sort is preferr'd to the Single, for the Largeness and Fairness of its double Flowers. This may be propagated as the last, but does not multiply quite so fast, nor do the Flowers appear so soon in the Spring, but they are of longer Duration.

The Great Snow-drop is pretty rare in England, and only to be found in some curious Gardens. This produces much larger Flowers than the common Sort, and generally rises eight or ten Inches high. It flowers toward the latter-end of February or the Beginning of March, and continues a long time in Beauty. This is also propagated by Off-sets as the former, but does not increase very fast: It requires a middling Soil which is fresh, but seldom thrives well in very rich Ground, and should be planted to an East or South-East Aspect, where it may have the Morning-Sun; in which Situation it will thrive better than if expos'd to a greater Heat.

The tallest Snow-drop is a very hardy Plant, and increases pretty fast by Off-sets, so that it is much commoner than the last. This flowers in April and May, and generally rises two Feet high. The Bulbs of this Kind are very large, and do greatly resemble those of the *Narcissus*, and the Leaves are very broad, but the Flowers are small, and seldom more than two or three produc'd upon each Stalk. These make a pretty Variety when intermix'd with other bulbous rooted Flowers.

All these Sorts may be transplanted when their Leaves are decay'd, before they strike out fresh Fibres, after which it will be too late to remove them: Their Roots may be kept out of the Ground two or three Months, if preserv'd in a dry Place, and may be planted in almost any Soil, but they thrive best in a fresh light sandy Earth.

NARCISSUS; [takes its Name of *ναρκος*, or *ναρκη*, a Torpidness or Deep-sleep, because the Smell of this Flower is said to cause a Heaviness of the Head, and a Stupidity. Plutarch tells us, This Plant was sacred to the infernal Gods. The Poets tell us, that *Narcissus* was the Son of *Cepheus* and the Nymph *Liriope*, a Youth of such excellent Beauty, that once upon a time coming to a Fountain to drink, and seeing his beauteous Image in the Water, he grew so enamour'd with it, that he pin'd away with Desire, and was transform'd into a Flower of his Name.] The Daffodil.

The Characters are;

It hath a Lily Flower, consisting of one Leaf, which is Bell-shap'd, and cut into six Segments, which incircle its Middle like a Crown; but the Empalement, which commonly rises out of a membranous Vagina, turns to an oblong or roundish Fruit, which is triangular, and gapes in three Parts, is divided into three Cells, and full of roundish Seeds.

The Species are;

1. NARCISSUS; *sylvestris, pallidus, calyce luteo*. C. B. P. Wild English Daffodil.
2. NARCISSUS; *medio-luteus, vulgaris*. Park. Common Pale Daffodil, or Primrose Peerless.
3. NARCISSUS; *major, totus, luteus, calice praelongo*. C. B. P. Great Yellow Spanish Daffodil, with a long Cup.
4. NARCISSUS; *latifolius, omnium maximus, amplo calice flavo, sive Nonpareille*. Park. Par. The Great Nonpareil or Nonfuch Daffodil.
5. NARCISSUS; *parvus, totus luteus*. C. B. P. Small Yellow Spanish Daffodil.
6. NARCISSUS; *luteus florum petalis reflexis*. C. B. P. Yellow Daffodil, with the Leaves of its Flowers turning back.
7. NARCISSUS; *multiplex, totus flavus*. C. B. P. Common Yellow Daffodil, with a double Flower.
8. NARCISSUS; *incomparabilis, flore pleno, partim flavo, partim croceo*. H. R. Par. The incomparable Double Daffodil, with the Flower-leaves partly yellow, and partly of a Saffron Colour.
9. NARCISSUS; *latifolius, flore plenissimo, petalis majoribus candidis, minoribus aureis interpositis*.

terpolatis. Boerb. Ind. Nonfuch Daffodil, with a very double Flower, whose larger Leaves are white, but the lesser Leaves (which are intermix'd) of a Gold Colour.

10. NARCISSUS; *latifolius, flore plenissimo, petalis majoribus pallidis, minoribus flavis interpolatis*. Boerb. Ind. Nonfuch Daffodil, with a very double Flower, whose larger Leaves are of a pale Colour, which are intermix'd with smaller Leaves of a yellow Colour.

11. NARCISSUS; *latifolius, flore plenissimo, petalis partim flavis, partim viridibus interpolatis*. Broad-leav'd Daffodil, with a very double Flower, whose Leaves are some yellow, and others green, intermix'd, commonly call'd Tradescant's Daffodil.

12. NARCISSUS; *Anglicus, flore pleno*. The Double English Daffodil.

13. NARCISSUS; *latifolius, sulphureus vel albus, brevi calice*. C. B. P. Broad-leav'd Daffodil, with a Brimstone-colour'd Flower, having a short Cup.

14. NARCISSUS; *latifolius, sulphureus, calicis brevis, aurei, ora fimbriatâ*. Boerb. Ind. Alt. Broad-leav'd Brimstone-colour'd Daffodil, with a short Gold-colour'd Cup fring'd about the Edge.

15. NARCISSUS; *Illyricus, Liliaceus*. C. B. P. The Sea Daffodil, or Narcissus tertius Matthioli.

16. NARCISSUS; *maximus, pallidus, foliis incanis*. C. B. P. Greater Pale-colour'd Daffodil.

17. NARCISSUS; *albus multiplex*. Park. Par. The Double white Daffodil, or Narcissus.

18. NARCISSUS; *albus, circulo croceo*. C. B. P. The White Daffodil, with the Rim of the Cup of a Saffron Colour.

19. NARCISSUS; *Narbonensis, five medio luteus, serotinus major*. Park. Par. The Great late-flowering French Daffodil.

20. NARCISSUS; *Orientalis, albus, calice luteo campanula similis maximus*. C. B. P. The Bosselman's Narcissus; vulgò

21. NARCISSUS; *Orientalis, albus, calice luteo, medius*. C. B. P. Oriental White Daffodil, with a yellow Cup.

22. NARCISSUS; *luteus, polyanthos, Lusitanicus*. C. B. P. Yellow Portugal Daffodil, with many Flowers.

23. NARCISSUS; *Orientalis, albus, minor, calice sulphureo pallido amplo*. Boerb. Ind. Lesser white Oriental many-flower'd Daffodil, with an ample pale Brimstone-colour'd Cup.

24. NARCISSUS; *pallidus, medio aureus*. C. B. P. Pale Daffodil, with a Golden Cup, commonly call'd Le Soleil D'Or.

25. NARCISSUS; *Orientalis, albus, calice luteo, minor*. C. B. P. Lesser White Oriental Daffodil, with a yellow Cup.

26. NARCISSUS; *Orientalis, albus, calice stellato*. C. B. P. Oriental White Daffodil, with a starry Cup.

27. NARCISSUS; *Orientalis, lacteus, maximus, calice pallido amplo*. Boerb. Ind. Largest Oriental White Daffodil, with an ample pale Cup, commonly call'd The Czar of Muscovy.

28. NARCISSUS; *Orientalis, maximus, lacteus, calice pallido parvo*. Boerb. Ind. Greatest White Oriental Narcissus, with a small pale-colour'd Cup.

29. NARCISSUS; *Orientalis, major, polyanthos, totus albus*. H. Eyf. Great Oriental Narcissus, with many white Flowers upon a Stalk.

30. NARCISSUS; *Orientalis, medius, polyanthos, totus albus*. H. Eyf. Middle Oriental Narcissus, with many white Flowers upon a Stalk.

31. NARCISSUS; *Orientalis, minor, polyanthos, totus albus*. H. Eyf. Lesser Oriental Narcissus, with many white Flowers upon a Stalk.

32. NARCISSUS; *Juncifolius, oblongo calice, luteus, major*. C. B. P. Single Yellow Jonquil, with a large oblong Cup.

33. NARCISSUS; *Juncifolius, luteus minor*. C. B. P. Lesser single Yellow Jonquil.

34. NARCISSUS; *Juncifolius, flore pleno*. Clus. Cur. Post. Double Yellow Jonquil.

35. NARCISSUS; *Juncifolius, petalis angustissimis, calice maximo tubam referente*. Boerb. Ind. Rush-leaf'd Daffodil, with very narrow Petals, and a large tubulous Cup, commonly call'd the Hoop-Petticoat.

36. NARCISSUS; *Juncifolius flore pallidior, calice flavo*. C. B. P. Rush-leaf'd Daffodil, with a paler Flower, and a yellow Cup.

There are several other Varieties of these Flowers, which are annually brought over from *Holland* and *Flanders*, where the Gardeners are very industrious in raising these and most other Bulbous-rooted Flowers from Seeds, whereby they continually procure some new Varieties, which recompences them for their Trouble and Expence: But in *England* there are very few Persons who have Patience to propagate any of these Flowers that Way, it being commonly five Years before they can expect to see the Fruits of their Labour: however, after the first five Years are past, if there be Seeds sown every Year, there will be annually a Succession of Flowers to shew themselves; so that there will be a continual Expectation, which will take off the Tedioufness which, during the first five Years, might be very troublesome to some Persons; and the annual Production of new Flowers corresponding to the annual Sowing, it will be as if the Product arose soon after.

The not practising this Method, has occasion'd our sending Abroad annually for great Quantities of Flower-Roots, which have been kept up to a great Price, on account of the great Demand for 'em in *England*; whereas if we were as industrious to propagate them as our Neighbours, we might soon vie with them, if not out-do 'em, in most Sorts of Flowers; as may be easily seen, by the vast Variety of *Carnations*, *Auricula's*, *Ranuncula's*, &c. which are what have been produc'd from Seeds in *England*, and do exceed every thing of those Kinds in any Part of *Europe*.

I shall therefore first lay down the Method of propagating these Flowers from Seeds; and afterwards proceed to the necessary Directions for increasing them from Off-sets; with the manner of treating the Roots, to produce strong Flowers.

You

You must be very careful, in saving your Seeds, to gather none but from such Flowers as have good Properties, and particularly from such only as have many Flowers upon a Stalk, that flower tall, and have beautiful Cups to their Flowers; from such you may expect to have good Flowers produc'd: But if you sow ordinary Seed, it is only putting your self to Trouble and Expence to no Purpose; since from such Seeds there can be no Hopes of procuring any valuable Flowers.

Having provided your self with good Seeds, you must procure either some shallow Cases or flat Pans made on purpose for the raising of Seedlings, which should have Holes in their Bottoms to let the Moisture pass off; these must be fill'd with fresh light sandy Earth about the Beginning of *August*, (this being the best Season for sowing the Seeds of most Bulbous-rooted Flowers) which must be levell'd very even; then sow the Seeds thereon pretty thick, covering 'em over with fine sifted light Earth about half an Inch thick, and place the Cases or Pans in a Situation where they may have only the Morning Sun 'till about Ten o'Clock, where they should remain until the Beginning of *October*, when they must be removed into a warmer Situation, placing 'em upon Bricks, that the Air may freely pass under the Cases, which will preserve them from being too moist.

They should also be expos'd to the full Sun, but screen'd from the cold *North* and *East* Winds, where they may remain until the Beginning of *April*, by which time the Plants will be up, when you must carefully clear 'em from Weeds; and if the Season should prove dry, they must be frequently water'd: The Cases should also now be remov'd into their former shady Position; for the Heat of the Noon-day Sun will be too great for the young Plants.

The latter-end of *June*, when the Leaves of the Plants are decay'd, you should take off the upper Surface of the Earth in the Cases, (which by that time will have contracted a Mossiness, and, if suffer'd to remain, will greatly injure the young Roots), observing not to take it so deep as to touch the Roots; then sift some fresh light Earth over the Surface about half an Inch thick, which will greatly strengthen the Roots: The same should also be repeated in *October*, when the Cases are mov'd into the Sun.

During the Summer-season, if the Weather should prove very wet, and the Earth in the Cases appear very moist, you must remove 'em into the Sun 'till the Earth be dry again; for if the Roots receive much Wet during the time they are unactive, it very often rots them; therefore you must never give 'em any Water after their Leaves are decay'd, but only place 'em in the Shade, (as was before directed.)

Thus you should manage them the two first Seasons, 'till their Leaves are decay'd the second Summer after sowing, when you should carefully take up the Roots; which may be done by sifting the Earth in the Cases with

a fine Sieve, whereby the Roots will be easily separated from the Earth; then having prepared a Bed or two of good fresh light Earth, in proportion to the Quantity of your Roots, you should plant 'em therein at about three Inches Distance every Way, and about three Inches deep in the Ground.

These Beds should be rais'd above the Level of the Ground, in proportion to the Moisture of the Soil, which, if dry, three Inches will be enough; but if it be wet, they must be rais'd six or eight Inches high, and laid a little rounding to shoot off the Wet.

If these Beds are made in *July*, which is the best time to transplant the Roots, the Weeds will soon after appear very thick; therefore you should gently hoe the Surface of the Ground, to destroy 'em; being very careful not to cut so deep as to touch any of the Roots; and this should be repeated as often as may be found necessary by the Growth of the Weeds, observing always to do it in dry Weather, that they may be effectually destroy'd: And toward the latter-end of *October*, after having intirely clear'd the Beds from Weeds, you should sift a little rich light Earth over them about an Inch thick, the Goodness of which will be wash'd down to the Roots by the Winter's Rain, which will greatly encourage their Shooting in the Spring.

If the Cold should be very severe in Winter, you should cover the Beds with Pease-haulm, or some such light Covering, to prevent the Frost from penetrating the Ground to the Roots, which might greatly injure them while they are so young.

In the Spring, when the Plants begin to appear above-ground, you must gently stir the Surface of the Ground, clearing it from Weeds, &c. in doing of which, you should be very careful not to injure the Plants: And if the Season should prove dry, you should now-and-then gently refresh 'em with Water, which will strengthen the Roots.

When their Leaves are decay'd, you should clear the Beds from Weeds, and sift a little Earth over 'em, (as was before directed); which must also be repeated in *October*, in like manner; and so every Year continu'd 'till the Roots flower, when you should mark all such as promise well, which should be taken up as soon as their Leaves decay, and planted at a greater Distance in new-prepared Beds: But those which do not flower, or those you do not greatly esteem, should be permitted to remain in the same Bed; therefore, in taking up those Roots which you mark'd, you must be careful not to disturb the Roots of those left, and also to level the Earth again, and sift some fresh Earth over the Beds (as before), to encourage the Roots; for it often happens, in the Seedlings of these Flowers, that at their first time of Blowing, their Flowers do seldom appear half so beautiful as they do the second or third Year; for which Reason none of them should be rejected until they have flower'd two or three times, that so you may be assured of their Worth.

Thus

Thus having laid down Directions for the Sowing and Managing these Roots, until they are strong enough to flower; I shall proceed to give some Instructions for Planting and Managing the Roots afterwards, so as to cause 'em to produce large fair Flowers.

All the Sorts of *Narcissus* which produce many Flowers upon a Stalk, should have a Situation defended from Winds, otherwise they'll be subject to be brought down when in Flower; for notwithstanding their Stalks are generally pretty strong, yet the Number of Flowers upon each, renders their Heads weighty, especially after Rain, which lodges in the Flowers, and, if succeeded by strong Winds, very often destroys their Beauty, if they are expos'd thereto; so that a Border under a Hedge, which is open to the South-East, is preferable to any other Position for these Flowers.

The Morning Sun rising upon them will dry off the Moisture which had lodged upon them the preceding Night, and cause 'em to expand fairer than when they are planted in a shady Situation; and if they are too much expos'd to the Afternoon Sun, they will be hurry'd out of their Beauty very soon; and the strong Winds usually coming from the *West* and *South-West* Points, they will be expos'd to the Fury of them, which frequently is very injurious to them. But you should not plant them under a Wall, or any other close Fence; for that will reflect the Heat too greatly upon the Flowers, and also draw them up with weak Stems, so that they will not flower so strong, nor continue so long in Beauty.

Having made choice of a proper Situation, you must then proceed to prepare the Earth necessary to plant them in; for if the natural Soil of the Place be very strong, or poor, it will be proper to make the Border of new Earth, removing the former Soil away about a Foot deep. The best Earth for these Flowers is a fresh light hazle Loam, mix'd up with a little very rotten Dung, or Tan; this should be well mix'd together, and often turn'd over, in order to sweeten it: Then having remov'd away the old Earth at least a Foot deep, you should put a Laying of rotten Dung or Tan in the Bottom about two Inches thick, upon which you must lay some of the prepared Earth about four Inches thick, making it exactly level; then having mark'd out by Line the exact Distances which the Roots are to be planted (which should not be less than four or five Inches square) you must place the Roots accordingly, observing to set them upright; then you must cover them over with the before-mention'd Earth about six Inches deep, being very careful, in doing of it, not to displace the Roots: When this is done, you must rake the Surface of the Border even, and make up the Side strait, which will appear handsome.

The best Time for planting these Roots is in *August*; for if they are kept too long out of the Ground, it will cause their Flowers to be very weak. You should also observe the Nature of the Soil where they are planted,

and, whether the Situation be wet or dry, according to which you should adapt the fresh Earth, and order the Beds; for if the Soil be very strong, and the Situation moist, you should then make choice of a light Earth, and raise the Beds six or eight Inches above the Level of the Ground, otherwise the Roots will be in danger of perishing by too much Wet: But if the Situation be dry, and the Soil naturally light, you should then allow the Earth to be a little stronger: And the Beds should not be rais'd above three Inches high; for if they are made too high, the Roots will suffer very much, if the *Spring* should prove dry, nor would the Flowers be near so fair.

Toward the Middle of *October*, if the Weeds have grown upon the Beds, you should, in a dry Day, gently hoe the Surface of the Ground, to destroy them, observing to rake it over smooth again: After which, they will require no farther Care till the *Spring*, when their Leaves will appear above-ground, at which Time you should gently stir the Surface of the Earth, with a small Trowel, being very careful not to injure the Leaves of the Plants, and rake it smooth with your Hands, clearing off all Weeds, &c. which, if suffer'd to remain at that Season, will soon grow so fast, as to appear very unsightly, and will exhaust the Nourishment from the Earth. With this Management these Roots will flower very strong, some of which will appear in *March*, and the others in *April*; which, if suffer'd to remain, will continue in Beauty a full Month, and are at that Season very great Ornaments to a Flower-Garden.

After the Flowers are past, and the Leaves decay'd, you should stir the Surface of the Ground, to prevent the Weeds from growing; and if at the same time you lay a little very rotten Dung over the Surface of the Beds, the Rain will wash down the Salts thereof, which will greatly encourage the Roots the succeeding Year.

During the Summer-season they will require no farther Care, but to keep them clear from Weeds 'till *October*, when the Surface of the Beds should be again stirr'd, raking off all Weeds, &c. and laying some good fresh Earth over the Beds about an Inch deep, which will make good the Loss sustain'd by Weeding, &c. and in the *Spring* you must manage as was before directed for the preceding Year.

These Roots should not be transplanted oftener than every third Year; because the first Year after removing they never flower so strong as they do the second and third; nor will the Roots increase so fast when they are often transplanted; but if you let them remain longer than three Years unremov'd, the Number of Off-sets, which by that time will be produced, will weaken the large Bulbs, and cause them to produce very weak Flowers; therefore, at the time of transplanting them, all the small Off-sets should be taken off, and planted in a Nursery bed by themselves, but the large Bulbs may be planted again for Flowering. If you plant them in the same Bed where they grew before, you must take out

all the Earth a Foot deep, and fill it up again with fresh, in the manner before directed, which will be equal to removing them into another Place: This is the constant Practice of the Gardeners in *Holland*, who have but little Room to change their Roots; therefore they every Year remove the Earth of their Beds, and put in fresh, so that the same Place is constantly occupy'd by the like Flowers.

The common Sorts of *Daffodil* are generally planted in large Borders of the Pleasure-Garden, where being intermix'd with other Bulbous-rooted Flowers, do afford an agreeable Variety in their Seasons of Flowering: These Roots are very hardy, and will thrive in almost any Soil or Situation, which renders 'em very proper for Rural Gardens, where being planted under the Shade of Trees, they will endure several Years without transplanting and produce annually, in the *Spring*, great Quantities of Flowers, which afford an agreeable Prospect.

The *Jonquils* should be planted in Beds, or Borders, separate from other Roots; because these require to be transplanted at least every other Year, otherwise their Roots are apt to grow long and slender, and seldom flower well after; which is also the Case, if they are continued many Years in the same Soil; wherefore the Roots should be often remov'd from one Part of the Garden to another, or at least the Earth should be often renew'd, which is the most probable Method to preserve these Flowers in Perfection.

The Soil in which these Flowers succeed best, is a Hazle Loam, neither too light, nor over-stiff; it must be fresh, and free from Roots of Trees, or noxious Weeds; but should not be dung'd; for 'tis very remarkable, that where the Ground is made rich, they seldom continue good very long, but are subject to shoot downwards, and form long slender Roots.

These Flowers are greatly esteem'd by many People for their strong sweet Scent, tho' there be very few Ladies that can bear the Smell of them; so powerful is it, that, many times, it overcomes their Spirits, especially if confined in a Room; for which Reason they should never be planted too close to an Habitation, lest they become offensive; nor should the Flowers be placed in such Rooms where Company is entertain'd.

NASTURTIIUM: [This some derive of *Nasi Tormentum*, i. e. the Torment of the Nose; because it has such an Acrimony, that the Smell of the Seed bruised will provoke Sneezing.] Cress.

The Characters are;

The Flower consists of four Leaves, which are placed in Form of a Cross: The Pointal, which rises from the Centre of the Flower-cup, becomes a roundish smooth Fruit, which is divided into two Cells, by the intermediate Partition, obliquely placed, with respect to the Valves, and furnish'd with Seeds, which are generally smooth: To which may be added, The Leaves are cut into many Parts, by which Cress is distinguish'd from *Thlaspi*, or Treacle-Mustard.

The Species are;

1. **NASTURTIIUM;** *bortense, vulgatum.* C. B. P. Common Garden-Cress.

2. **NASTURTIIUM;** *bortense, crispum.* C. B. P. Curl'd Garden-Cress.

3. **NASTURTIIUM;** *bortense, latifolium.* C. B. P. Broad-leav'd Garden-Cress.

4. **NASTURTIIUM;** *sylvestre, capsulis cristatis.* Tourn. Swine's-Cress, or Warted Bucks-horn.

The first Sort is commonly cultivated in Gardens as a Sallet-herb, and is chiefly esteem'd in the *Winter* and *Spring*, it being one of the warm Kind. During the *Winter* Season, it must be sown upon a gentle Hot-bed, and cover'd with either Mats or Glasses, to preserve it from great Rains or Frost, both of which are equally destructive at that Season: In the *Spring* it may be sown in warm Borders, where, if it be defended from cold Winds, it will thrive very well: But if you would continue it in *Summer*, you must sow it upon shady Borders, and repeat sowing every Week, otherwise it will be too large for Use; for at that Season it grows very fast.

The *Broad-leav'd* and *Curl'd* Sorts are preserv'd in some Gardens for Curiosity Sake, and to garnish Dishes, but the common Sort is equally as good for Use. These should be sown somewhat thinner than the common Sort, and when the Plants come up, they should be drawn out, so as to leave the remaining ones half an Inch asunder, whereby they will have Room to expand their Leaves, in which their Difference from the common Sort consists.

In order to preserve these Varieties distinct, you must carefully separate all such Plants as appear inclin'd to degenerate from their Kinds, leaving only such of the broad-leav'd Kind as have very fair broad Leaves; and so of the curl'd Sort, only such as have their Leaves very much curl'd; being very careful not to intermix 'em together. When the Seeds are ripe, the Plants should be drawn up, and spread upon a Cloth two or three Days to dry, after which the Seeds should be beaten out, and preserved in a dry Place for Use.

NASTURTIIUM INDICUM; *vide* *Acri-viola.*

NATURAL; is belonging to, or proceeding from *Nature*.

NATURAL FACULTY; is that Faculty or Action whereby Bodies are increased, nourished, or preserved.

NATURE; is a Term variously used, and Mr. Boyle, in a Treatise of *The vulgarly receiv'd Notion of Nature*, gives us eight principal ones.

1. *Nature* is used for the System of the World, the Machine of the Universe, or the Assemblage of all created Beings.

In this Sense we say, the *Author of Nature*, meaning God; and speaking of the Sun, call him the *Father of Nature*, because he warms the Earth, and makes it fruitful; and the *Eye of Nature*, because he illuminates the Universe; and of a Phoenix, an Unicorn, a Griffin,

fin, a Satyr, that there are no such Things in Nature.

2. *Nature*, in a more confined Sense, comprehends the several Kinds of Beings, created and uncreated; corporeal and spiritual; thus we say, human *Nature*, i. e. all Men who possess the same rational Soul; angelical *Nature*; divine *Nature*.

3. *Nature*, in a still more restrain'd Sense, is used for the Essence of a Thing, or that Attribute that makes a Thing what it is, as 'tis the *Nature* of the Soul to think.

4. *Nature* is particularly used for the establish'd Order and Course of material Things, the Series of the Second Causes, or the Laws that God has impos'd on the Motions impress'd by him. In this Sense we say, The Day and Night, by *Nature*, succeed one another; Physick is the Study of *Nature*; Respiration is by *Nature* necessary to Life.

Again, in this Sense we say, Miracles are Effects above Powers of *Nature*; and that Art exceeds *Nature*, by means of Machines and moving Powers which produce Effects which go beyond what we see in the common Course of Things.

5. *Nature* is also used to signify an Aggregate of Powers, which belong to any Body, especially a living one. Thus we say, *Nature* is strong, *Nature* is weak, *Nature* is spent, &c.

6. *Nature* is also more strictly used for the Action of Providence, the Principle of all Things, or that spiritual Being which is diffus'd throughout the Creation, and moves and acts in all Bodies, and gives them certain Properties, and procures certain Effects. In this Sense, *Nature* signifies the Qualities or Virtues that God has given to his Creatures, Animal, Vegetable, &c.

In speaking of the Action of *Nature*, no more is to be understood, but that *Bodies act on one another*, in a Manner, agreeable to the general Laws of Motion which the Creator has established.

Mr. Boyle also proposes a Notion of *Nature*, as more fit than any yet given, to pass for the principal one of *Nature*; with regard to which, many Axioms and Expressions relating to the Word *Nature*, may be conveniently understood; and in order to this, he distinguishes between *general* and *particular Nature*.

General Nature he defines the Aggregate of the Bodies that make up the World, consider'd as a Principle, by Virtue whereof, they act and suffer according to the Laws of Motion, prescrib'd by the Order of Things.

Particular Nature of any subordinate or individual, consists in the *general Nature*, apply'd to a distinct Portion of the Universe. Or, it is a Convention of the Mechanical Properties, (as Magnitude, Figure, Order, Situation, and Local Motion) of Parts convenient and sufficient to constitute, or intitle to its particular Species or Denominations, the particular Body they make up; the Concourse of all these being consider'd, as the Principle of Motion, Rest, &c.

The *Laws of Nature* are Axioms or General Laws and Rules of Motion and Rest, ob-

serv'd by natural Bodies in their Actions one on another; and in all the Changes which befall them in their *natural State*.

The *Laws of Nature* and of Motion are in Effect the same: Custom, indeed, has made some Difference, and we find Authors call the particular Cases of Motion, *Laws of Motion*; the more general or catholick ones, and those from which, as from Axioms, the others are deduc'd, they call *Laws of Nature*.

Of these Sir Isaac Newton has establish'd three *Laws of Nature*:

1. Every Body perseveres in the same State, either of Rest, or Uniform Motion; except so far as it is forced to change that State by some foreign Force.

Thus *Projectiles* persevere in their Motions, so far as 'till they are retarded by the Resistance of the Air, and the Cause of Gravity; and thus a Top, whose Parts, by Cohesion, are continually drawing one another out of their Rectilinear Motion, only ceases to run round, because resisted by the Air, and the Friction of the Plane whereon it moves. And thus the larger Bodies of the Planets and Comets preserve their progressive, circular Motion a long Time undiminish'd, in Regions void of all sensible Resistance.

2. *The Change of Motion is ever proportional to the Moving Force, whereby it is effected, and in the Direction of the Right Line, wherein that Force is impress'd.*

If a certain Force produce a certain Motion, a double Force will produce double the Motion, a triple Force triple the Motion, whether it be impress'd all at once, or successively, by Degrees. And this Motion, since it is ever directed to the same Point, (with the generating Force) if the Body were in Motion before, is either to be added to it, as if the Motions conspire, or subtracted from it, as where contrary; or added obliquely, as where oblique; and is compounded with it, according to the Determinations of each.

3. *Reaction is always contrary and equal to Action; or the Actions of two Bodies upon one another are always mutually equal, and directed contrary Ways.*

Whatever presses or pulls another, is equally press'd or pull'd thereby. Thus, if I press a Stone with my Finger, the Finger is equally press'd by the Stone; if a Horse draw a Weight by a Rope, the Horse is equally drawn back by the Weight; for the Rope being equally stretch'd each Way, will, with an equal Endeavour to relax itself, drive the Horse towards the Stone, and the Stone towards the Horse, and will hinder the Progress of the one as much as it promotes that of the other.

Again; if any Body, by striking on another, do, in any manner, change its Motion, it will itself, by means of the other, undergo an equal Change in its own Motion, by Reason of the Equality of the Pressure.

In these Actions the Changes are equal; not those, we mean, of the Velocities, but those of the Motions, the Bodies being suppos'd free of any other Impediments. For the Changes

Changes of Velocities, which are likewise made contrary Ways, inasmuch as the Motions are equally changed, are reciprocally proportionate to the Bodies.

For a further Illustration of the three foregoing Laws of Motion take what follows :

As to the first of those Laws of Motion, *That all Bodies do persevere in the same State of Rest or Moving, &c.* consider how inviolably this Law is observ'd by Natural Agents : For it never has yet been observ'd that any Body did bring itself from *Rest* to *Motion* ; nor that ever any Body in *Motion* did bring itself to *Rest* ; nor that ever any Body in *Motion* alter'd its Course of itself : But that there were always evident Causes, where-ever such Cases have happen'd.

If it were so, that the Bodies of themselves did change their Places, then all Things would run into Confusion ; nor would there be any certain Means to regulate the Universe. It is certain, that *Projectiles* would for ever move on the same strait Line, were not their own Motion stopp'd by the *Air*, their own *Gravity*, or the *Ruggedness* of the Place on which they mov'd ; or if some Body by a different Direction did not alter their Course. For Instance, a *Top*, whose Parts, by their Cohesion, hinder one another's Rectilinear Motions, if the *Air* did not gradually impair its Motion, would for ever turn round.

Natural Bodies consist of a Mass of Matter which can never alter its State of itself ; and Bodies that are once at *Rest*, must continue so, till some new Force put them into Motion. If Bodies are once in Motion, the same Energy will continue them in Motion, and drive them forwards with the same Direction.

And besides, There is in Matter a *Passive Principle*, which by Sir *Isaac Newton* is aptly call'd, The *Vis Inertiae* ; by which Principle, Bodies do to the utmost of their Power resist any Change or Alteration of their State, whatever it be, either of *Rest*, *Motion*, or its *Direction* ; and this Resistance is always equal in the same Body ; and in different Bodies is proportional to the Quantity of Matter they contain.

There is as much Force requir'd to stop a Body in Motion, as is requir'd to put it into Motion, and on the contrary : And therefore since the same Body resists equally the contrary equal Changes of the State ; this Resistance will as powerfully operate to keep a Body in *Motion*, as to keep it at *Rest*, and by consequence it can never change its State of *Rest*, *Motion* or *Direction* of itself : For to change its Direction, and of itself to move itself another way, is one and the same thing ; so that *Matter* of itself is so far indifferent as to *Motion* or *Rest*, that it is not inclin'd more to one than it is to the other ; and does resist a Change from *Rest* to *Motion*, as much as it does from *Motion* to *Rest*.

This Passive Principle in Matter, or *Vis Inertiae*, is very conspicuous in the Motion of a Vessel full of Liquor upon a Horizontal

Plane ; for at the first, while the Vessel is in Motion along the Plane, the Liquor in it seems to move with a Direction contrary to that of the Vessel, the Water rising on the hinder Side of the Vessel.

This is not because there is any such Motion impress'd upon the Water, but because the Water endeavouring by its *Vis Inertiae* to continue in its State of *Rest*, the Vessel is not able to communicate its Motion to it immediately, because of the Bulk and fluid State of it ; but the Water perseveres in its State of *Rest*, while the Vessel makes forward, and so seems to move a contrary Way. But as soon as the Water has the Motion of the Vessel intirely communicated to it, and begins to move with a Velocity equal to that of the Vessel ; if you stop the Vessel on a sudden, the Water still continues its Motion, and dashes over the Sides of the Vessel.

This *Vis Inertiae*, or Passive Principle, is essential to Matter ; for it neither can be depriv'd of it, nor intended or remitted in the same Body, but is always in Proportion to the Quantity of Matter Bodies do contain.

From what has been before said, the following Corollaries may be deduc'd :

1. It appears plain from hence, That neither any Particle of Matter, or Combination of Particles, *i. e.* *No Body*, can either move of it, or themselves, or alter the Direction of their Motion by themselves : For *Matter* is not endow'd with Self-Motion, nor with a Power to alter the Course in which it is put ; but is merely Passive, and must of itself for ever continue in that State and Course that it is settled in, for ever ; and if it cannot move of itself, it never can of itself alter its Course, when it is in Motion : For of itself to alter its Course, is no other than to move of itself after a particular Manner.

2. It is also plain from hence, that no Body, when it is once put into Motion, will of itself naturally move in a curve Line. All Motion is naturally forward in the same strait Line with the Direction of the Moving Force ; but whatsoever does move in a curve Line, must alter its Direction in every Point ; and therefore no Body can naturally move of itself in a curve Line.

3. Hence it appears, that those great Bodies, the *Planets*, their *Satellites*, and *Comets* (though they are at first put into Motion) do not naturally, and of themselves, move in their respective Orbits, which are curve Lines, returning into themselves ; but are kept in them by some attracting Force ; which if it were once suspended, they would run out in right Lines for ever : And of Consequence, the Motions of these vast Bodies in their Orbits depend absolutely upon this attracting Force. And thence it is,

4. That neither *Motion* nor *Rest* (not one of them particularly) is essential to Matter : That is as much as to say, that Matter is indifferent as to either of these particularly, and does

does no less resist its being chang'd from *Rest* to *Motion*, than it does being chang'd from *Motion* to *Rest*. And as any Force will impress some Degree of *Motion* on a resting Body; so, in like manner, the same Degree of Force being impress'd at the same Time with a contrary Direction, will bring it again to *Rest*; but it is not absolutely necessary, as to the Being of Matter, that it be either in *Motion* or *Rest*. For, let Matter be in which of these States soever, it will still be Matter. And so, since the *Vis Inertia* or passive Principle is essential to Matter, it thereby becomes indifferent as to *Rest* or *Motion*, and is equally susceptible of either, according as the external Force urges it.

5. Hence may be demonstrated the Necessity of a *Vacuum*, or Space distinct from Matter; For since it is so that all Bodies do by their *Vis Inertia*, to the utmost of their Power, resist any manner of Change or Alteration of their State either of *Rest* or *Motion*; and since the Resistance is always equal in the same Body, or the same, and in different Bodies, is proportionable to the Quantity of Matter whereof they consist; and since, by Consequence, if two Bodies which contain equal Quantities of Matter, moving with equal Quickness in contrary Directions, so that they strike directly upon one another, they will for certain both *rest* or *stop* at the Point of their Meeting or Concourse; as also it being demonstrable, That two Bodies moving with equal Celerities contrary one to the other, and both resting where they meet, are equally heavy; it then follows of Necessity, that two Bodies, which contain equal Quantities of Matter, are equally heavy: and if this be allow'd, if there were two Spheres of equal Diameters, and there were no Vacuities in Bodies, they would contain equal Quantities of Matter, and of consequence would be of equal Weight, *i. e.* Two Spheres, the one of *Wood*, and the other of *Gold*, would have the same Specifick Gravities; but this being contradicted by Experience, Vacuities in the Sphere of *Wood* must of Necessity be admitted to answer for the Difference of their Gravities.

As to the Second, *That the Changes made in the Motion of Bodies are always proportional, &c.* that may be illustrated by the following Considerations:

Effects are always in Proportion to their adequate Causes; and if any Degree of Force produce any Degree of *Motion*, then it follows, That a double Degree of the same Force will produce a double Degree of *Motion*; and a three-fold Degree of the same Force, a three-fold Degree of the same *Motion*; and so on: And this *Motion* must of Necessity proceed in the same Direction as that of the Force moving, since the *Motion* is caus'd only by it; and because by the former Law, Bodies which are in *Motion* cannot change their Directions of themselves; so that except their Course be alter'd by some new Force, the Bodies must proceed in the same Direction with that of the moving Course. And if a

Body was before in *Motion*, the *Motion* which arises from that impress'd Force, if in the same Direction, does so much increase the former *Motion*; if it has a contrary Direction, it destroys a Part of the former *Motion*, equal to that which is impress'd; when it has a Direction oblique to the former *Motion*, it is either added to or subtracted from the former *Motion*, according as the *Motion*, arising from a Composition of these two, is determin'd.

From what has been said, it plainly appears, That in the present Constitution of Things, there can be no perpetual *Motion*. By a *perpetual Motion* you are to understand an uninterrupted Communication of the same Degree of *Motion*, from one Part of Matter to another in a Circle: Not as Bodies, which are put into a *Motion*, do for ever continue in the same, unless so far as they are resisted or stopp'd by other Bodies; but a Circulation of the same Quantity of *Motion*, so as it returns perpetually undiminis'd from the first Mover.

For, *Motion* produc'd (by the Law) is but proportionable to the Force generating; and all the *Motions* which are perform'd on this Globe, being perform'd in a resisting Fluid (the Air) a considerable Quantity of this *Motion* must necessarily be spent in the Communication, on this *Medium*, and so of consequence it is impossible that the same Quantity of *Motion* should return undiminis'd upon the first Mover; which is necessary, in order to a *perpetual Motion*.

Besides, such is the Nature of material Organs, That a greater or lesser Degree of Friction cannot be avoided, although the Machine should be fram'd according to the most exact Principles of *Geometry* and *Mechanicks*, there not being in Nature any Congruity that is perfect, or Smoothness that is exact; the Manner of Cohesion of Bodies; the small Proportion the solid Matter bears to the Vacuities in them, not admitting of them so to be. And besides, an ordinary Microscope will discover how very imperfect our most finish'd Mechanick Performances are.

Now as the Things before-mention'd must very considerably diminish the Force communicated, it is impossible there should be a perpetual *Motion*, except the Force communicated were greater than the Force generating, by so much as to make amends for the Diminution made therein by all these Causes; so that the *Motion* impress'd may never return undiminis'd to the first Mover: But that being contrary to this Law, it is evident, that the *Motion* must decrease, till at last it stops, and so of consequence, in the present State of Things, there cannot be any perpetual *Motion*.

As to the Third Law, *That Repulse and Reaction is always equal to Impulse or Action, &c.*

To illustrate this, consider, That whatsoever presses or draws another, is as much press'd or drawn by that other. If a Stone be press'd by the Finger, the Finger is press'd by the Stone again. If an Anvil be struck with a Hammer, the Hammer is struck by the Anvil with equal Force. If a Horse draw a Stone

forward by a Rope, the Stone does equally draw back the Horse; for the Rope being distended equally both Ways, does equally act upon both; as we intimated before.

That the Steel draws the Loadstone as much as the Magnet draws the Steel, appears evidently, by making both swim in Water. And in the Descent of heavy Bodies, the Earth is attracted by the Stone, as much as the Stone is by the Earth, *i.e.* The Earth gravitates towards the Stone, as much as the Stone does towards the Earth: And the Motions, which are produc'd by both these Gravitations, are equal in both, excepting that the Stone is altogether inconsiderable, compar'd to the Bulk of the Earth; and so of consequence the Velocity of the Motion of the Earth towards the Stone is inconsiderable, compared to the Motion of the Stone towards the Earth; and therefore the Earth's Motion towards the Stone is insensible.

And universally in all the Actions of Bodies; if one Body act on another, and change its Motion any manner of Way, that other Body will make the same Change in the Motion of this Body, with a contrary Direction; so that there are equal Changes made by these Actions, of the Motion, but not of the Velocities: For the Changes which are made on the Velocities in contrary Directions are in a Proportion, which is reciprocal to the Bodies.

NEBULOSE or NEBULOUS, signifies cloudy, misty, foggy, hazy.

NECTARINE; [probably so call'd of *Nectar*, the Poetical Drink of the Gods.] Nectarine.

This Fruit should have been placed under the Article of *Peaches*, to which it properly belongs, differing from them in nothing more than in having a smooth Rind, and the Flesh being firmer. These the *French* distinguish by the Name of *Brugnon*, as they do those *Peaches* which adhere to the Stone, by the Name of *Pavies*, retaining the Name of *Pesche* to only such as part from the Stone: But since the Writers in Gardening have distinguish'd this Fruit by the Name of *Nectarine* from the *peaches*, so I shall follow their Example, lest by endeavouring to rectify their Mistakes, I should render my self less intelligible to the Reader. I shall therefore mention the several Sorts of this Fruit which have come to my Knowledge:

1. *Fairchild's Early Nectarine*. This is one of the earliest ripe *Nectarines* we have: It is a small round Fruit, about the Size of the *Nutmeg Peach*, of a beautiful red Colour, and well flavour'd; it ripens the Middle of *July*.

2. *Ebruge Nectarine* is a middle-siz'd Fruit of a dark-red or purple Colour next the Sun, but of a pale yellow or greenish Colour towards the Wall; it parts from the Stone, and has a soft melting Juice. This ripens in the End of *July*.

3. *Newington Nectarine* is a fair large Fruit, (when planted on a good Soil) of a beautiful red Colour next the Sun, but of a bright yel-

low towards the Wall; it has an excellent rich Juice, the Pulp adheres closely to the Stone, where it is of a deep red Colour. This ripens the Beginning of *August*.

4. *Scarlet Nectarine* is somewhat less than the last, of a fine red or scarlet Colour next the Sun, but loses it self in paler red towards the Wall. This ripens in the End of *July*.

5. *Brugnon or Italian Nectarine* is a fair large Fruit, of a deep red Colour next the Sun, but of a soft yellow toward the Wall; the Pulp is firm, of a rich Flavour, and closely adheres to the Stone, where it is very red. This ripens in the Middle of *August*.

6. *Roman Red Nectarine* is a large fair Fruit, of a deep red or purple Colour towards the Sun, but has a yellowish Cast next the Wall; the Flesh is firm, of an excellent Flavour, closely adhering to the Stone, where it is very red. This ripens the Middle of *August*.

7. *Murry Nectarine* is a middle siz'd Fruit, of a dirty red Colour on the Side next the Sun, but of a yellowish green towards the Wall; the Pulp is tolerably well flavour'd. This ripens the Middle of *August*.

8. *Golden Nectarine* is a fair handsome Fruit, of a soft red Colour next the Sun, but of a bright yellow next the Wall; the Pulp is very yellow, of a rich Flavour, and closely adheres to the Stone, where it is of a faint red Colour. This ripens the Beginning of *September*.

9. *Temple's Nectarine* is a middle-siz'd Fruit, of a soft red Colour next the Sun, but of a yellowish Green towards the Wall; the Pulp is melting, of a white Colour towards the Stone, from which it parts, and has a fine poignant Flavour. This ripens in the Middle of *September*.

10. *Peterborough or late Green Nectarine* is a middle-siz'd Fruit, of a pale green Colour on the Outside next the Sun, but of a whitish Green towards the Wall; the Flesh is firm, and, in a good Season, well flavour'd. This ripens at the End of *September*.

There are some Persons who have mention'd more Sorts than I have here set down, but I much doubt whether they are different from those here mention'd, there being so near Resemblance between the Fruits of this kind, that it requires a very close Attention to distinguish them well, especially if the Trees grow in different Soils and Aspects, which many times alters the same Fruit so much as hardly to be distinguish'd by Persons who are very conversant with them; therefore in order to be thoroughly acquainted with their Differences, it is necessary to consider the Shape and Size of their Leaves, the Size of their Flowers, their Manner of Shooting, &c. which is many times very helpful in knowing of these Fruits: All which, together with a more ample Description of them, as also the true Shape of the Flowers, Leaves and Fruits engraven on Copper Plates, and painted from the Life, will, I hope, be exhibited by the Society of Gardeners, for those who are curious to know their several Distinctions.

The Culture of this Fruit differing in nothing from that of the *Peach*, I shall forbear mentioning

tioning any thing on that Head in this Place, to avoid Repetition, but refer the Reader to the Article *Perfica*, where there is an ample Account of their *Planting, Pruning, &c.*

NEMORAL, signifies belonging to a Wood or Grove.

NEMOROSE, signifies full of Woods or Groves.

NEPETA; *vide* *Cataria*.

NERVES are long tough Strings, which run either across or lengthways in the Leaves of Plants.

NICOTIANA: [This Plant takes its Name of *James Nicotius*, Counsellor to *Francis II.* King of *France*, who, in the Year 1560, being an Ambassador in the Court of *Portugal*, bought this Plant of a *Dutchman*, that brought it from *America*, and sent it to *Queen Catharine de Medicis* in *France*; where being sown, it produced Seeds: The *Indian* Inhabitants call it *Tabac*, because it grew in an *Island* call'd *Tabaco*. The lesser Sort is call'd *Hyoscyamus*, because it agrees with this Plant; but the Flowers differ, altho' the Virtues are the same: It is also call'd *Priapeia*.] Tobacco.

The Characters are;

The Flower consists of one Leaf, is funnel-shap'd, and divided at the Top into five deep Segments, which expand like a Star; the Ovary becomes an oblong or roundish membranaceous Fruit, which is divided into two Cells by an intermediate Partition, and is fill'd with small roundish Seeds.

The Species are;

1. **NICOTIANA**; *major, latifolia*. C. B. P. The greater broad-leav'd Tobacco.
2. **NICOTIANA**; *major, angustifolia*. C. B. P. The greater narrow-leav'd Tobacco.
3. **NICOTIANA**; *major, angustifolia, perennis*. *Jessieu*. The greater narrow-leav'd perennial Tobacco.
4. **NICOTIANA**; *minor*. C. B. P. The lesser or common English Tobacco.
5. **NICOTIANA**; *minor, foliis rugosioribus, amplioribus*. *Vaill.*

The first Sort is known by the Planters in *America* under the Title of *Oronoka*; of which there seems to be two different Kinds, varying in the Largeness and Texture of their Leaves, some having very broad, rough, roundish Leaves; and others are narrower, smoother, and do terminate in a Point: But neither of these Sorts are esteem'd by the *American* Planters, because the Produce of this (tho' it is much greater than the narrow-leav'd Sort) yet is not near so much esteem'd by the *English*. This Sort is commonly cultivated in *Germany*, about *Hanover* and *Strasburgh*, and is somewhat hardier than the narrow-leav'd Sorts, which renders it preferable to that for cultivating in Northern Climates.

This Plant is order'd by the College of Physicians for Medicinal Use, and is what should be made use of for the *Unguentum Nicotianæ*, (or Ointment of Tobacco) though many times the Lesser or English Tobacco is brought to Market for that Purpose.

The narrow-leav'd Sort is commonly call'd The *Sweet-scented Tobacco*, from its having a much more agreeable Scent, when smok'd, than the broad-leav'd Sort; the Smoak of which is very offensive to most Persons who have not been accustom'd to it. This Sort is cultivated in great Plenty in *Virginia, Cuba, Brasil*, and several other Parts of *America*; from whence it is brought to most Parts of *Europe*, but especially to *England*, it being prohibited to be cultivated in this Country, lest his Majesty's Revenues should be thereby lessened: But as a small Quantity is permitted to be cultivated for Medicinal Use, I shall briefly set down the Method how it may be propagated, so as to have fair large Leaves for that Purpose.

The Seeds of this Plant must be sown upon a moderate Hot-bed in *March*; and when the Plants are come up, they should be transplanted into a new Hot-bed of a moderate Warmth, about four Inches asunder each Way, observing to water and shade them until they have taken Root: after which you must let them have Air in Proportion to the Warmth of the Season, otherwise they will draw up very weak, and be thereby less capable of enduring the open Air: You must also observe to water them frequently, (but while they are very young it should not be given to them in too great Quantities) though when they are pretty strong they will require to have it often and in plenty.

In this Bed the Plants should remain until the Beginning of *May*; by which time (if they have succeeded well) they will touch each other, therefore they should be enur'd to the open Air gradually: after which they must be taken up carefully, preserving a large Ball of Earth to each Root, and planted into a rich light Soil, in Rows two Feet asunder, and the Plants a Foot Distance in the Rows, observing to water them until they have taken Root; after which they will require no farther Care (but only to keep them clear from Weeds) until the Plants begin to shew their Flower-stems; at which time you should cut off the Tops of them, that their Leaves may be the better nourish'd, whereby they will be render'd larger, and of a thicker Substance. In *August* they will be full grown, when they should be cut for Use; for if they are permitted to stand longer, their under Leaves will begin to decay.

The Perennial Sort was brought from the *French* Settlements in the *West-Indies* into the *Royal Garden* at *Paris*, where it is cultivated in small Quantities for making Snuff. The Seeds of this kind I receiv'd from *Monsieur de Jessieu*, Demonstrator of the Plants in the *Royal Garden*; It has succeeded very well in the *Physick Garden*, and abides the Winter in a common Green-house without artificial Heat.

The two smaller Sorts of Tobacco are preserv'd in Botanical Gardens for Variety, but are seldom propagated for Use. The first Sort is found growing upon Dunghills in divers Parts of *England*. These are both very hardy, and

and may be propagated by sowing their Seeds in *March* upon a Bed of light Earth, where they will come up, and may be transplanted into any part of the Garden.

NIGELLA; [so call'd, as though *Nigrella*, from the Colour of its Seed, because the Seeds of this Plant are for the most part black. It is also call'd *Melanthium*, of *μῆλα* black, and *ἄνθος* a Flower, q. d. black Flower, altho' the Flower is not black. It is also call'd *Melaspermum*, of *μῆλας* black, and *σπέρμα* Seed.] Fennel Flower, or Devil in a Bush.

The Characters are;

The Flower-cup consists of five Leaves, which expand in Form of a Star, and branch out into many other small narrow Leaves; the Flower consists of many Leaves plac'd orbicularly, and expand in Form of a Rose, having many short Stamina surrounding the Ovary in the Center of the Flower: which Ovary becomes a membranaceous Fruit, consisting of several Cells, which are furnish'd with Horns on the Top, and are full of Seeds.

The Species are;

1. **NIGELLA**; *arvensis cornuta*. C. B. P. Wild horned Fennel-Flower.

2. **NIGELLA**; *latifolia, flore majore, simpliciter cerulea*. C. B. P. Broad-leav'd Fennel-Flower, with a large single blue Flower.

3. **NIGELLA**; *angustifolia, flore majore simpliciter ceruleo*. C. B. P. Narrow-leav'd Fennel-Flower, with a large single blue Flower.

4. **NIGELLA**; *angustifolia, flore majore simpliciter albo*. C. B. P. Narrow-leav'd Fennel-Flower, with a large single white Flower.

5. **NIGELLA**; *flore majore, pleno ceruleo*, C. B. P. Double blue *Nigella*, or Fennel-Flower.

6. **NIGELLA**; *flore minore, simpliciter candido*. C. B. P. Fennel Flower, with a small white single Flower.

7. **NIGELLA**; *flore minore, pleno & albo*. C. B. P. Fennel-Flower, with a small double white Flower.

8. **NIGELLA**; *Orientalis, flore flavo, semine alato plano*. T. Cor. Oriental Fennel-Flower, with a yellow Flower, and a flat-wing'd Seed.

9. **NIGELLA**; *Cretica, latifolia, odorata*. Park. Theat. Broad-leav'd, Sweet-scented, Candy Fennel-flower.

There are some other Varieties of this Plant which are preserv'd in some curious *Botanick* Gardens, but those here mention'd are what I have observ'd cultivated in the *English* Gardens at present.

All these Plants may be propagated by sowing their Seeds upon a Bed of light Earth, where they are to remain (for they seldom succeed well if transplanted); therefore in order to have them intermix'd amongst other annual Flowers, in the Borders of the Flower-Garden, the Seeds should be sown in Patches at proper Distances; and when the Plants come up, you must pull up those which grow too close, leaving but three or four of them in each Patch, observing also to keep them clear from Weeds, which is all the Culture

they require. In *July* they will produce their Flowers, and their Seeds will ripen in *August*, when they should be gather'd, and dry'd; then rub out each Sort separately, and preserve them in a dry Place.

The Season for sowing these Seeds is in *March*, but if you sow some of them in *August*, soon after they are ripe, upon a dry Soil, and in a warm Situation, they will abide the Winter, and flower strong the succeeding Year; by which Method they may be continu'd in Beauty most part of the Summer.

The fifth Sort is that which is most commonly cultivated in *England*, the Seeds of which are sold in the Seed Shops, but the other Sorts do deserve to be preserv'd as much as that; for the various Sorts, when rightly intermix'd, do afford an agreeable Variety. They are all annual Plants, which perish soon after they have perfected their Seeds; which if permitted to scatter upon the Borders, will come up without any farther Care. The Plants commonly grow about a Foot high, and if they have a good Soil will send forth many Branches, each of which terminates in a Flower.

NIGELLASTRUM; vide *Lychnis segetum majore*.

NIGHT-SHADE; vide *Solanum*.

NIL; vide *Anil*.

NISSOLIA; Crimson Grass-Vetch; *vulgô*.

The Characters are;

It hath a papilionaceous Flower, like the *Lathyrus*, to which this Plant agrees in every respect, excepting the Leaves, which in this are produc'd singly, and are not terminated by Claspers.

There is but one Species of this Plant, which is,

NISSOLIA; *vulgaris*. Tourn. Common Crimson Grass-Vetch.

This Plant is found wild in several Parts of *England*, growing commonly by the Sides of Foot-Paths, but is not very common near *London*: I have gather'd it in a Field just before you come to *Putney-Common*, on the Left-hand Side of the Road, under the Hedge which parts the Field from the Road.

This Plant may be cultivated by sowing the Seeds in *August*, soon after they are ripe, on a dry Soil, and in a warm Situation, where they will rise soon after, and endure the Cold of our Climate very well, and flower early the succeeding *Spring*; but if you sow the Seeds in the *Spring*, the Plants commonly decay before they come to flower, as I have several times experienc'd: therefore you need only to let the Seeds fall upon the Ground when they are ripe, and they will grow without any farther Trouble, but only to keep them clear from Weeds.

The Flowers of this Plant are smaller than those of the Sweet Pea, but are much the same in Shape, and of a fine scarlet Colour, so that being intermix'd in large Borders amongst these and other annual Plants, it makes a pretty Variety,

Variety, and deserves a Place in every good Garden.

NITRE is a kind of Salt impregnated with abundance of Spirits out of the Air, which renders it volatile.

Monsieur *Le Clerc* gives us the following Account of it :

In *Egypt* they make a great Quantity of it, but it is not so good, for it is dusky, and full of Knots and Stones.

It is made almost in the manner that Salt is made, but only that they use Sea-water in their Salt-works, and the Water of *Nile* about their *Nitre*.

When the *Nile* retires, their *Nitre-Pits* stand soaking for forty Days together ; but as the *Nitre* is grown firm, they are in haste to carry it off, lest it should melt again in the Pits: They pile it up in Heaps, and it keeps very well.

The *Memphian Nitre* grows strong, and there are several Pits of Stone thereabouts : Out of these they make Vessels, and some they melt down with Sulphur among their Coals.

This same *Nitre* they use also about such Things as they would have to last a long time.

The Proof of the Goodness of *Nitre* is, that it be very light, very friable, and very near of a purple Colour.

There is but little Difference between the *natural* and *artificial Nitre* ; that the one refines itself, and the other is refined by Art, as Salt ; and, indeed, all *Nitre* is a kind of Salt, and hardly differs from Salt, properly so call'd, farther than in these respects ; that well-refin'd *Nitre* is more acid and lighter than Salt, and easily takes Fire.

The Reason of which Difference, he says, seems to be,

1. That the Angles at both Ends of the oblong Particles of *Nitre* are shorter than the Angles of the saline Particles.

2. That the Particles of *Nitre* are finer and fuller of Pores ; which when the Particles of Fire get in, they soon put the nitrous Particles into a Hurry, till they break to Pieces, and turn to Flame.

3. *Nitre* exceeds Salt in Lightness, because the *saline* Particles contain more homogeneous Matter in the same Compass than the *nitrous* do.

Dr. *Lister* tells us, He has view'd the Particles of *Nitre* through a *Microscope*, and found them to have six Angles, Parallelogram-sides, and pointed like a Pyramid at one End.

Some Authors are of Opinion, That the *nitrous Salts* seem to be assign'd by Nature chiefly for the Growth of Plants.

Others differ from them in Opinion, and say, That when *Nitre* is contiguous to Plants, it rather destroys than nourishes them: But yet they allow, that *Nitre* and other *Salts* do certainly loosen the Earth, and separate the concreted Parts of it, and by that means, fit and dispose them to be assum'd by Water, and carry'd up into the Seed or Plants, for its Formation and Augment.

It is observable, how all Salts are wrought upon by *Moisture* ; how easily they liquitate and run with it : And when these are drawn off, and have deserted the Lumps wherewith they were incorporated, those must moulder immediately, and fall asunder of course.

The hardest Stone, if it has any Salt mix'd with the Sand of which it consists, upon being expos'd to an humid Air, in a short time dissolves and crumbles all to pieces ; and much more will clodded Earth or Clay, which is not of near so compact and solid a Constitution as Stone is.

If the Earth be never so good, and fit for the Production of Vegetables, little will come of it, unless the Parts of it be separated and loose ; and for this Reason is the Ground digged, ploughed, and harrowed, and the Clods broken : And it is this Way that *Nitre*, *Sea-salt* and other *Salts* promote Vegetation.

A certain Gentleman has given a Relation, That he dwelling in the Country, near a *Peter-house*, where such *Salt-peter*, as is brought from abroad, is boil'd and refin'd to make Gunpowder ; this being so near as to communicate the Steam of the *Nitre* to the greatest Part of the Orchard and Garden : And tho' some were of Opinion, that it injured his Trees and Plants, yet he found that it had a contrary Influence upon his Orchard, &c. in that it never fail'd to bring him a plentiful Crop of Fruit every Year, although those about him had but very little, or scarce any, notwithstanding his Orchard, &c. was not less expos'd to blighting Winds by its natural Situation than the other Orchards in the same Town. From whence he judg'd, that the *nitrous* Vapour which mixes with the Air that surrounds his Orchard, prevents Blights, and is noxious to the Caterpillars.

The Lord *Bacon*, in his *Natural History*, commends the Use of *Nitre*, for the Preservation of Health in human Bodies ; and many skilful *Botanists* have given it no less a Character for the Preservation of Vegetables, if its Quantity be rightly proportion'd.

That the Atmosphere does abound with *saline* Particles, is most certain ; for being fill'd continually with *Effluvia* from Earth and Sea, it must needs have from both a great Quantity of *saline* Corpuscles ; and these will be of different Kinds, according to the Variety of those *Salts* from whence they are deriv'd.

NOLI ME TANGERE ; *vide* *Balsamina Mas*.

NONSUCH, or FLOWER OF BRISTOL ; *vide* *Lychnis*.

NORTHERN ASPECT is the least favourable of any in *England*, as having very little Benefit from the Sun, even in the Height of Summer, therefore can be of little Use, whatever may have been advanc'd to the contrary ; for although many Sorts of Fruit-trees will thrive and produce Fruit in such Positions, yet such Fruit can be of little Worth, since they are depriv'd of the kindly Warmth of the Sun to

correct their crude Juices, and render them well tasted and wholesome. Therefore it is to little Purpose to plant Fruit trees against such Walls, except it be those which are intended for Baking, &c. where the Fire will ripen, and render those Juices wholesome, which for want of Sun could not be perform'd while growing.

You may also plant *Morello Cherries* for Preserving; and *White* and *Red Currants* to come late, after those which are expos'd to the Sun are gone: And if the Soil be warm and dry, some Sorts of *Summer Pears* will do pretty well on such an Exposure, and will continue longer in eating, than if they were more expos'd to the Sun. But you should by no means plant *Winter Pears* in such an Aspect, as hath been practis'd by many ignorant Persons; since we find, that the best *South Walls*, in some Years, are barely warm enough to ripen those Fruits.

NOVEMBER: Work to be done in the Kitchen-Garden.

Your *Asparagus Beds*, which were not dress'd the last Month, should not be deferr'd any longer than the Beginning of this; therefore you should cut down the Haulm, and hoe the Weeds from off the Beds into the Alleys, where they must be bury'd; and the Earth taken out of the Alleys should be spread over the Beds, in the manner directed under the Article of *Asparagus*.

You must now trench up the Ground between your *Artichokes*, laying a large Ridge of Earth over the Roots equally on their Sides and Tops, (as hath been directed under the Article of *Artichokes*;) which will prevent their being injured by Frosts, and preserve their Roots better than if cover'd with long Dung, as is practis'd by some unskilful Persons.

In this Month you must dung and dig the Ground which is intended for early Crops, laying it in Ridges until the Time you make use of it, which will be of great Service to refresh and sweeten the Ground.

You must also plant *Beans*, and sow *Peas*, in a warm Situation, to succeed those put in the last Month.

Sow *Lettuce*, *Cresses*, *Turnip*, *Mustard*, and other Sallet-herbs, under Glasses, for Winter Use; and make Hot beds for *Asparagus*, to cut at *Christmas*.

If the Weather be mild in this Month, you must let your *Cauliflower* and *Lettuce* Plants under Glasses have as much Air as possible, by setting off the Glasses every Day in dry Weather: But you must not suffer 'em to receive too much Wet at this Season, which often proves very injurious to them.

In dry Weather take up your *Endive* that is full grown, and lay it into deep Trenches, in a warm dry Place, to blanch for Use: And earth up your *Celery*, to whiten it, being careful not to draw the Earth too high, lest you bury the leading Shoots of the Plants, which will rot 'em. You must also earth up those *Peas* and *Beans* which were sown in *September*,

to preserve their Stems from being injured by the Frost.

Carry Dung into the Quarters of the Kitchen-Garden, that it may be ready for Use when you want to dig the Ground, which will forward your Affairs greatly: The not observing of this, many times causes a great Hurry of Business together, which should always be avoided as much as possible.

Take up the Roots of *Carrots*, *Parsnips*, and *Potatoes*, laying them in dry Sand, in a Place where they may be defended from Frost and Wet, for the Winter and Spring Use; for if they are permitted to remain in the Ground, they are, many times, spoil'd by Frost, or much Wet.

Earth up the Stems of your *Cauliflower* Plants, which are under Bell or Hand-glasses, and clear 'em from all dead or decay'd Leaves, as you must also those in the Frames; for if they are suffer'd to remain upon 'em, it very often proves injurious to them.

You must now fresh tie your Reed-hedges, otherwise the strong Winds, which frequently happen in this Month, will tear them down, and break the Reeds, which will render it troublesome to repair them.

Those who have Hot-beds of *Cucumbers*, &c. must look well to 'em at this Season; for this and the next Month are commonly the two worst in the whole Year for Hot-beds; there being then but little Sun, and commonly great Rains or Snow, which greatly abates their Heat; and foggy Weather, (which generally happens at this Season) is the most injurious to tender Plants of any other.

At the Beginning of this Month you should sow some *Radishes* and *Carrots* in warm Borders under Walls or Hedges, to come early in the Spring: And if the Weather be mild, you may yet transplant *Cabbage* Plants for Summer Use, as also *Coleworts* for Spring Use.

Your *Spinage*, *Onions*, *Carrots*, &c. which were sown in *July* and *August*, should be kept clear from Weeds, otherwise they will be smother'd, and thereby rotted, especially if the Season be moist.

Products of the Kitchen-Garden this Month.

Cabbages, *Savoy*s, *Cauliflowers*, *Brown Cole* or *Bore Cole*; some late *Artichokes*, and *Spinage* which was sown in *July*.

Roots: *Beets*, *Carrots*, *Parsnips*, *Skirrets*, *Potatoes*, *Turnips*, *Scorzoner*a, *Salsify*, *Onions*, *Garlick*, *Horse-Radish*, &c.

For Sallets: *Lettuce*, *Cresses*, *Turnips*, *Mustard*, *Corn Sallet*, *Coriander*, and other small Herbs, from Hot-beds, or under warm Walls; also *Endive*, *Celery*, *Brown Dutch* and *Common Cabbage Lettuces*, if the Season prove mild.

For Soup, &c. *Beet Leaves*, *Thyme*, *Savory*, *Hyssop*, *Sorrel*, *Chardons*, *Celery*, &c.

Work to be done in the Fruit-Garden.

If the Season be mild, you may still prune *Pears*, *Apples*, and other hardy Fruit-Trees, either in Standards, or against Walls or *Espaliers*: But it is not good to do it too late in the Month,

Month, lest great Rains and Frosts succeeding each other, hurt the Trees where their Wounds are fresh.

You must now divest your *Fig Trees* of all their late Fruit, which, if left upon the Trees, will rot and infect the tender Branches; and nail the Shoots of these Trees close to the Wall, whereby they will be preserv'd better from the Injuries of Frost, than if they shou'd be left growing at a Distance from it.

Such Fruit-Trees as were planted for Standards the last Month should be carefully staked, and those against Walls or Espaliers fasten'd thereto, to prevent their being shaken or blown out of the Ground by the Violence of the Wind, whereby their young Fibres, which about this Time will be putting out, are often destroy'd, to the no small Prejudice of the Trees.

Prune *Gooseberries*, *Currants* and *Raspberries*, and dig up the Ground between their Rows, in which may be planted *Colworts* for Spring Use, which will be gone before the Blossoms of these Fruits come out, so that they will not in the least injure 'em.

Clear your *Strawberry-beds* from Weeds and Runners, and dig up the Alleys between the Beds, spreading a little Earth betwixt the Plants, which will greatly strengthen 'em against the succeeding Spring: And if the Ground be very poor, you may spread a little very rotten Dung over the Beds, which will be very helpful to the Plants.

You may transplant Fruit-Trees at the Beginning of the Month, if the Weather be mild, upon a dry Soil: But it were better done the foregoing Month; because the Soil being then warm, they put out new Roots immediately, which strengthens 'em to endure the Winter; whereas those which are late planted rarely take fresh Root before the Spring.

Such Trees as were planted the last Month should have the Surface of the Ground about their Roots carefully mulch'd, to prevent the Frost from penetrating to their Roots.

Fruits in Prime, or yet Lasting.

Pears: *Lechasserie*, *Ambrette*, *Epine d'Hyver*, *Petit-oin*, *Crasane*, *Saint Germain*, *Colmar*, *Louise-bonne*, *Messire-Jean*, *Martin-sec*, *Lansac*, *Amadotte*, *Spanish Boncretien*, *Virgoulé*, with some others of less Note.

Apples: *Rennet Grise*, *Aromatick Pippin*, *Nonpareil*, *Golden Pippin*, *Calville Rouge*, *Calville Blanc*, *Courpendu*, *Fenouillet*, *Hertsfordshire Pearmain*, *Holland Pippin*, *French Pippin*, *Kentish Pippin*, *Harvey Apple*, *Pile's Russet*, *Golden Russet*, *Wheeler's Russet*, *Winter Queening*, with some others of less Note.

Bullace, *Chestnuts*, *Hazle-nuts*, *Wall-nuts*, *Medlars*, *Services*, *Almonds*, and some late *Figs* and *Grapes*.

Work to be done in the Flower-Garden:

The Beginning of this Month you must finish planting your Bulbous and other Flower Roots which are design'd to be planted before Winter; for if they be set later, there will not be Time for 'em to take Root before the

Frost comes and prevents them, so that they will be in danger of being destroy'd.

Your Boxes or Pots of Seedling Bulbs should now be placed in a warm Situation, where they may have the Benefit of the Sun, and be shelter'd from the cold Winds.

Your choice *Carnations* and *Auricula's* should now be remov'd into Shelter, or their Pots turn'd down on their Sides, to prevent their receiving too much Moisture, which will be apt to rot them.

If the Weather be mild, you may yet transplant *Piony's*, *Monks Hoods*, *Flag Iris's*, and most other Knobbed-rooted Plants; as also *Lychnis's*, *Veronica's*, *Canterbury Bells*, *London Pride*, *Rockets*, *Sweet Williams*, *Daizies*, *Starworts*, and many other hardy Fibrose-rooted Flowers.

Cut down the Stalks of such late-flowering Plants which now begin to decay, and cover the Borders of the Pleasure-Garden with a little fine Earth, raking them over smooth: Also the Beds of Bulbous-rooted Flowers, which were not remov'd the last Season, should have some rich fresh Earth spread over them, (as hath been directed under their several Articles.)

You may now transplant *Roses*, *Lylac's*, *Syringa's*, *Laburnums*, *Spirea Frutex*, *Honey-suckles*, *Jasmines*, and most other hardy-flowering Shrubs, if the Soil be dry where they are to be planted, otherwise it is better to defer it until February.

Turn and make up fresh Composts for the several Sorts of Flowers, laying it up in Heaps very close, to prevent the Rain from soaking into it in large Quantities, which wou'd be hurtful to it.

Toward the Latter End of this Month, if the Weather should prove frosty, you must cover your choice Beds of *Ranunculus's*, *Anemonies*, *Hyacinths*, and other curious Flowers, to prevent the Frost from penetrating to their Roots.

Plants now in Flower in the open Air.

Some Sorts of *Starworts* and *Golden Rods*, *Annual Stock-July-flowers*, *Double Colchicum*, *Saffron*, *Cyclamens*, *Perennial Sun-flower*, *Hearts-ease* or *Three-colour'd Violet*: And in mild Weather, some *Single Anemonies* and *Polyanthus Narcissus's*, where they were not remov'd the last Summer.

Trees and Shrubs now in Flower in the open Air.

Arbutus or *Strawberry Tree*, *Laurus Tinus*, *Musk Rose*, *Passion Flower*, *Spanish Clematitis* or *Travellers Joy*: And against warm Walls, *Yellow Indian*, *Spanish* and *Azorian Jasmines*, *Candy Tuft Tree*, &c.

Work to be done in the Green-house and Stove.

At the Beginning of this Month you must carry into the Green-house such of your hardy Exotick Plants as have been kept abroad 'till this Time; and at this Time also you should place all your Plants in the Order in

in which they are to remain during the Winter-season.

In mild Weather you must let your hardy Exoticks have as much free Air as possible, by opening the Sashes every Day; and you must every Day look over 'em, to see which of 'em wants Water, which should now be given them in the Morning, that the Damp may pass off before the Windows are close shut in the Evening: You must also pick off all decay'd Leaves which may be upon the Plants, and may be very injurious to them if suffer'd to remain long upon 'em, by infecting the Air of the House, and causing it to turn rancid, which being imbib'd by the Plants, renders them sickly.

The Weather now growing colder, you must increase the Fires of the Stoves in Proportion thereto, observing not to make 'em too hot, which would occasion the Plants shooting; nor suffer them to be too cold, lest their Leaves decay and drop off, which will be equally injurious to them. You must also give 'em Water as often as you shall find they require it; but the Water should be placed in the Stove at least twenty-four Hours before it be us'd, that it may have acquir'd a proportionable Heat to the Air of the Stove; and be very careful to pull off all decay'd Leaves, as also to wash and clean 'em from Insects and Filth, which they are very subject to contract at this Season.

You must not suffer your *Anana's* to remain in the Bark-beds longer than the Beginning of this Month, when, in a fine warm Day, you should remove 'em into the Stove, placing them where they may have a great Share of Heat, without which they will not produce Fruit.

Plants now in Flower in the Green-house and Stove.

Some Sorts of *Aloes*, *Ficoides's*, *Sedums* and *Cotyledons*; *Anemonospermus's* two or three Kinds; *Leonurus*, *Candy Tuft Tree*; *Yellow Indian*, *Spanish*, *Azorian*, and *Ilex-leav'd Jasmines*; *Geranium* several Sorts, *Cbrysanthemum arborescens*, *Doria's* two or three Sorts, *Senecio folio retuso*, *Large Blue Virginian Starwort*, *Double Flower'd Myrtle*, *Cassia Babamensis*, *Papaw*, *Sensitive Plants*, with some others.

NUCIFEROUS TREES, are such which produce *Nuts*.

NUMMULARIA, [takes its Name of *Nummus*, Lat. *Money*, because its Leaves, by their Roundness, resemble Money: It is also call'd *Centimorbia*, as tho' it were a Plant that cures an Hundred Diseases.] *Money-wort*, or *Herb Two-pence*.

This Plant grows wild in shady moist Places in divers Parts of *England*: But as it is seldom cultivated in Gardens, so I shall say nothing of its Culture in this Place.

NURSERY: There is no such thing as having a fine Garden or Plantation, with-

out a *Nursery* both for *Trees* and *Flowers*, in which there are continually new Varieties of *Fruits*, *Timber*, or *Flowering Trees*, and choice *Flowers*, rais'd for a Supply of the several Parts of the *Garden*, *Orchard*, and *Wilderness*. The Size of this *Nursery* must be proportion'd to the Extent of your Garden, or design'd Plantation; so that it is impossible to be exact in determining the Quantity of Ground necessary to be employ'd in this Way. But for a *Nursery* of *Fruit*, *Forest*, or *Flowering Trees*, there should not be less than two or three Acres for a large Garden; but for a small Garden half an Acre will be sufficient. And for a *Nursery* for *Flower Roots*, *Plants*, &c. one Acre for a large Garden, and a Quarter of an Acre for a small one, will be enough. But this (as I said before) cannot be well limited; since some Persons, who are very curious in raising vast Quantities of new *Flowers* from Seed, will employ more than three times the Ground that is necessary only to raise a Supply of *Flowers* for their Borders, which are either annual, or biennial, and require to be brought up to supply the Place of such as have flower'd and decay'd. But I shall first take Notice of the Method for Raising a *Nursery* of *Fruit* or *Forest Trees*: In doing of which, you should observe,

1. That the Soil in which you make the *Nursery* be not better than that where the *Trees* are to be planted out for good: The not observing this, is the Reason that *Trees* are often at a Stand, or make but little Progress, for three or four Years, after they come from the *Nursery*; as it commonly happens to such *Trees* as are rais'd near *London*, and carry'd into the Northern Parts of *England*, where being planted in a poor Soil, and a much colder Situation, their *Fruits* seldom ripen well: Therefore it is by far the better Method (when you have obtain'd the Sorts you would propagate) to raise a *Nursery* of the several Sorts of Stocks proper for the various Kinds of *Fruit* upon which you may bud or graft them; and those *Trees* which are thus rais'd upon the Soil, and in the same Degree of Warmth where they are to be planted, will succeed much better than those brought from a greater Distance, and from a richer Soil.

2. This Ground ought to be fresh, and not such as has been already worn out by *Trees*, or other large-growing Plants; for in such Soil your Stocks will not make any Progress.

3. It ought not to be too wet, nor over-dry, but rather of a middling Nature; tho', of the two Extremes, Dry is to be preferr'd: Because in such Soils (tho' the *Trees* do not make so great a Progress as in moist) yet they are generally sounder, and more dispos'd to Fruitfulness.

4. You must also observe to inclose it, that Cattle and Vermin mayn't come in, for these will make sad Havock with young *Trees*, especially in Winter, when the Ground is cover'd with Snow, that they have little other Food which they can come at; some of the most mischievous of these Animals are *Hares* and

and *Rabbits*, which are great Destroyers of young Trees at that Season, by eating off all their Bark, therefore you must carefully guard your *Nursery* against these Enemies.

The Ground being inclos'd, should be carefully trench'd about eighteen Inches, or two Feet deep, provided it will allow it; this should be done in *August*, that it may be ready to receive young Stocks at the Season for Planting, which is commonly at the Beginning of *October*. In Trenching of the Ground, you must be very careful to cleanse it from the Roots of all noxious Weeds, such as *Couch-grass*, *Docks*, &c. which, if left in the Ground, will get in amongst the Roots of the Trees, so as not to be gotten out afterwards, and will spread and over-run the Ground, to the great Prejudice of your young Stocks.

After having dug the Ground, and the Season being come for Planting, you must level down the Trenches as equal as possible; and then lay out the Ground into Quarters, proportionable to the Size thereof; and those Quarters may be afterwards laid out in Beds, for the sowing of Seeds, or the Stones of Fruit.

The best Sort of Stocks for *Peaches*, *Nectarines*, &c. are such as are rais'd from the Stones of the *Muscle*, and *White Pear-Plum*: But you should never plant Suckers of these, (which is what some People practise); for those seldom make so good Stocks, nor are ever well-rooted Plants: Besides, they are very subject to produce great Quantities of Suckers from their Roots, which are very troublesome in the Borders or Walks of a Garden, and do greatly injure the Tree; so that you should annually, or at least every other Year, sow a few other Stones, that you may never be at a Loss for Stocks.

For *Pears*, you should have such Stocks as have been rais'd from the Kernels of the Fruit where *Perry* hath been made; or else preserve the Seeds of some Sorts of Summer *Pears*, which do generally shoot strong and vigorous, as the *Cuisse Madam*, *Windsor*, &c. which you should sow for Stocks, early in the *Spring*, upon a Bed of good light fresh Earth, where they will come up in about six Weeks, and, if kept clear from Weeds, will be strong enough to transplant out the *October* following. But for many Sorts of Summer and Autumn *Pears*, *Quince* Stocks are preferable to free (*i. e.* *Pear*) Stocks; these are very often propagated from Suckers, which are generally produced in Plenty from the Roots of old Trees: but those are not near so good as such as are propagated from Cuttings, which have always much better Roots, and are not so subject to produce Suckers as the other; which is a very desirable Quality; since these Suckers do not only rob the Trees of Part of their Nourishment, but are very troublesome in a Garden.

Apples are grafted or budded upon Stocks rais'd from Seeds which come from the *Cyder* Press, or upon *Crab* Stocks; the latter of which are esteem'd for their Durableness, especially for large Standard Trees; these should be

rais'd from Seeds, as the *Pear* Stocks, and must be treated in the same manner; for those procured from Suckers, &c. are not near so good: But for small Gardens, the *Paradise* Stock hath been of late greatly esteem'd; it being of very humble Growth, causeth the Fruit-Trees grafted or budded thereon to bear very soon, and they may be kept in small Compass: But these are only proper for very small Gardens, or by way of Curiosity; since the Trees thus rais'd are but of short Duration, and seldom arise to any Size to produce Fruit in Quantities, unless the Graft or Bud be bury'd in Planting, so that they put forth Roots, and then they will be equal to Trees grafted upon free Stocks, since they receive but small Advantage from the Stock.

For *Cherries*, you should make use of Stocks rais'd from the Stones of the common *Black*, or the wild *Honey Cherry*, both of which are strong free Growers, and produce the cleanest Stocks.

For *Plums*, you may use the Stones of most free-growing Sorts; which will also do very well for *Apricocks*, these being not so difficult to take as *Peaches* or *Nectarines*: but (as I said before) these should not be rais'd from Suckers, for the Reason there assign'd, but rather from Stones.

There are some Persons who recommend the *Almond* Stock for several Sorts of tender *Peaches*, upon which they will take much better than upon *Plum* Stocks: But these being tender in their Roots, and apt to shoot early in the *Spring*, are by many People rejected: And I think, if such tender Sorts of *Peaches* which will not take upon *Plum* Stocks, were budded upon *Apricocks*; they would take very well; as would all Sorts of *Peaches* which are planted upon dry Soils continue much longer, and not be so subject to blight, if they were upon *Apricocks*; for it is observ'd, that upon such Soils where *Peaches* seldom do well, *Apricocks* will thrive exceedingly; which may be owing to the Strength and Compactness of the Vessels in the *Apricocks*, which render it more capable of assimilating or drawing its Nourishment from the *Plum* Stock, which in dry Soils seldom afford it in great Plenty to the Bud; and the *Peach* Tree being of a loose, spongy Nature, is not so capable to draw its Nourishment therefrom, which occasions that Weakness which is commonly observed in those Trees when planted on a dry Soil.

There are some People who of late have budded and grafted *Cherries* upon Stocks of the *Cornish Cherry*, which, they say, will render the Trees more fruitful, and less luxuriant in Growth, so that they may be kept in less Compass; these Stocks having the same Effect upon *Cherries*, as the *Paradise* Stock hath on *Apples*.

Having provided your self with young Stocks of all these different Sorts, which should be rais'd in the Seminary the preceding Year, you should proceed to transplanting of them in *October* (as was before directed) into the

Nursery. The Distance which they should be planted, if design'd for Standards, should be three Feet and an half, or four Feet, Row from Row, and a Foot and an half distant in the Rows; but if for Dwarfs, three Feet Row from Row, and one Foot in the Rows, will be a sufficient Distance.

In taking these Stocks out of the Seed-beds, you must raise the Ground with a Spade, in order to preserve their Roots as intire as possible; then with your Knife you should prune off all the very small Fibres; and if there are any which have a Tendency to root down-right, such Roots should be shortened: Then having thus prepar'd the Plants, you should draw a Line across the Ground intended to be planted, and with your Spade open a Trench thereby exactly strait, into which you should place them at the Distance before design'd, setting them exactly upright; and then put the Earth in close to them, filling up the Trench, and with your Foot press the Earth gently to the Roots of them, observing not to displace them so as to make the Rows crooked, which will render them unsightly. These Plants should by no means be headed, or pruned at Top, which will weaken them, and cause them to produce lateral Branches, and thereby spoil them.

If the Winter should prove very cold, it will be of great Service to your young Stocks, to lay some Mulch upon the Surface of the Ground near their Roots, which will prevent the Frost from penetrating the Ground so as to hurt the tender Fibres which were produced after planting: But you should be careful not to let it lie too thick near the Stems of the Plants, lest the Moisture of the Dung should hinder the tender Bark, which it often does where there is not due Care taken to prevent it.

In the Summer-season, you must always observe to hoe and destroy the Weeds; which if permitted to remain in the *Nursery*, will greatly weaken and retard the Growth of your Stocks: And the succeeding Years, you should observe to dig up the Ground every Spring between the Rows, which will loosen it so, as that the Fibres may easily strike out on each Side, and the Weeds will be thereby destroy'd: You should also observe, where any of the Stocks have shot out lateral Branches, to prune them off, that they may be encourag'd to grow upright and smooth.

The second Year after Planting, such of the Stocks as are design'd for Dwarf-trees, will be fit to bud; but those which are design'd for Standards, should be suffer'd to grow five or six Feet high before they are budded or grafted. The Manner of Budding and Grafting being fully describ'd under their respective Heads, I shall not repeat them in this Place; nor need I say any thing more of treating these Trees after budding, that being also treated of under the several Articles of Fruits; I shall only add, that those Stocks, which were budded in the Summer, and have fail'd, may be grafted the following Spring; but *Peaches* and *Nectarines* seldom take well

from Grafts; these should therefore be always budded.

The *Nursery* design'd for *Forest-trees* and *Flowering-shrubs*, should be larger than that for *Fruit-trees*, especially if you intend to make large Plantations of these Trees: But in planting of these, you should always observe to place the large growing Kinds by themselves, separate from those of lower Growth, otherwise the large Trees will overshade and starve the smaller: But as the Method of propagating all the different Sorts of these Trees, whether from Seeds, Cuttings or Layers, is set down under their several Articles, so it is needless to repeat it in this Place.

I shall therefore only add, that after you have drawn off the Trees from any Part of your *Nursery*, you should, for a Year or two, employ the Ground for Kitchen-Garden, or some other Summer-Crops, in order to refresh it, before you plant it again with Trees; and you should always observe to put different Sorts of Trees upon the Ground from those which grew in the same Place before, otherwise they seldom thrive well.

The Ground you intend for the *Flower-Nursery*, should be well situated to the Sun, but defended from strong Winds by Plantations of Trees or Buildings, and the Soil should be light and dry, which must always be observ'd, especially for bulbous rooted Flowers, which are design'd to be planted therein. The Particulars of which are exhibited under the Articles of *Flowers*.

In this *Nursery* should be planted the Offsets of all your bulbous-rooted Flowers, where they are to remain until they become blowing Roots; when they should be remov'd into the Pleasure-Garden, and planted either in Beds or Borders, according to the Goodness of the Flowers, or the Management which they require.

You may also, in this Ground, raise the several Sorts of bulbous-rooted Flowers from Seed, by which Means new Varieties may be obtain'd: But most People are discouraged from setting about this Work, from the Length of Time before the Seedlings will come to flower; however, after a Person hath once begun, and constantly continu'd sowing every Year, after the Parcel first sown has flower'd, the regular Succession of them coming annually to flower, will not render this Method so tedious as it at first appear'd.

The seedling *Auriculas*, *Polyanthus's*, *Ranunculus's*, *Anemonies*, *Carnations*, &c. should be rais'd in this *Nursery*, where they should be preserv'd until they have flower'd; when you should mark all such as are worthy of being transplanted into the Flower-Garden; which should be done in their proper Seasons: For it is not so well to have all these seedling Flowers expos'd to publick View in the Flower-Garden, because it always happens, that there are great Numbers of ordinary Flowers produc'd amongst them, which will make but an indifferent Appearance in the Pleasure-Garden.

In this Place also should be rais'd all the Sorts of Biennial or Perennial Flowers from Seeds, to supply the Borders of the Pleasure-Garden as the old Roots decay; such as *Stock-July-Flowers*, *Canterbury Bells*, *Fox Gloves*, *French Honeysuckles*, *Wall-flowers*, *Columbines*, *Hollyhocks*, *Campanula's*, and many other Sorts, which are all under their respective Articles treated of, with the Method of propagating each Kind: I shall therefore only add, That the Earth in this Nursery should be often chang'd, and fresh brought in; as also the several Sorts of Flowers which are there rais'd, should be every Year shifted into different Places, and not the same Sorts raised two or three Years upon the same Spot of Ground, for the Reason before assign'd.

NUX AVELLANA; *vide Corylus*.

NUX JUGLANS; [of *Nux* a Nut, and *Juglans*, as tho' *Jovis Glandis*, i. e. *Jupiter's Acron*.] The Walnut.

The Characters are;

It hath Male Flowers (or Katkins) which are produc'd at remote Distances from the Fruit on the same Tree: The outer Cover of the Fruit is very thick and green, under which is a rough hard Shell, in which the Fruit is inclos'd, surrounded with a thin Skin; the Kernel is deeply divided into four Lobes; and the Leaves of the Tree are pinnated, or winged.

The Species are;

1. **NUX JUGLANS**; *sive Regia vulgaris*. C. B. P. The Common Walnut.
2. **NUX JUGLANS**; *fructu maximo*. C. B. P. The large French Walnut.
3. **NUX JUGLANS**; *fructu tenero, & fragili putamine*. C. B. P. The thin-shell'd Walnut.
4. **NUX JUGLANS**; *bifera*. C. B. P. The Double Walnut.
5. **NUX JUGLANS**; *fructu serotino*. C. B. P. The late Ripe Walnut.
6. **NUX JUGLANS**; *fructu perduro*. Tourn. The Hard-shell'd Walnut.
7. **NUX JUGLANS**; *Virginiana nigra*. H. L. The Virginian Black Walnut.
8. **NUX JUGLANS**; *Virginiana, nigra, fructu oblongo, profundissime insculpto*. Rand. Virginian Black Walnut, with a long furrow'd Fruit.
9. **NUX JUGLANS**; *Virginiana, foliis vulgari similis, fructu subrotundo, cortice duriore levi*. Pluk. Alm. The Hickery, or White Virginian Walnut.
10. **NUX JUGLANS**; *Virginiana, alba, minor, fructu nuce moschatae similis, cortice glabro, summo fastigio, veluti in aculeum producto*. Pluk. Phyt. The small Hickery, or White Virginian Walnut.

The six Sorts first mention'd are propagated promiscuously in England, and I believe are all seminal Variations, and not distinct Species, as in most other Sorts of Fruit-trees; for it rarely happens, that the Trees rais'd from Seeds produce the same Sort of Fruit again: So that those who would be sure of their Fruit, should either make Choice of such Trees in the Nursery which have produc'd Fruit, and do prove to be the Sort they would have, or else

inarch the Sorts intended upon any common Walnut-Stock; in which Method they will succeed, but these seldom make so good Trees, as those which are rais'd from Seeds.

The second and third Sorts are chiefly prefer'd for their Fruit, which are very large; and the Shells of the third Sort are so tender, as to be broken between the Fingers without any Difficulty, for which Reason it is esteem'd the best worth propagating, for the Fruit, of any of the Sorts.

The *Virginian* Sorts are preserv'd as Rarities by such Persons who are curious in collecting the several Sorts of Trees; but these are all worth cultivating for their Timber, which is preferable to that of our common Walnuts, and these Trees are equally as hardy, and some of them of much quicker Growth than the common Sort, especially the seventh and eighth Sorts; the latter of which produces great Quantities of Fruit annually in the Physick Garden, but they are of no Use, except to propagate the Species; for their Shells are so hard as scarcely to be broken with a Mallet, and the Kernel is so small that it is not worth the Trouble of coming at it.

All the Sorts of Walnuts which are propagated for Timber, should be sown in the Places where they are to remain, for the Roots of these Trees do always incline downward; which being stopp'd or broken, do prevent their aspiring upward, so that they afterwards divaricate into Branches, and become low spreading Trees; but such as are propagated for Fruit, are greatly mended by transplanting, for hereby they are render'd more fruitful, and their Fruit are generally larger and fairer: It being a common Observation, That downright Roots do greatly encourage the luxuriant Growth of Timber in all Sorts of Trees; but such Trees as have their Roots spreading near the Surface of the Ground, are always the most fruitful.

The Nuts should be preserv'd in their outer Covers in dry Sand until February; when they should be planted in Lines, at the Distance you intend them to remain; but in the Rows they may be plac'd pretty close, for fear the Nuts should miscarry; and the young Trees, where they are too thick, may be remov'd after they have grown three or four Years, leaving the Remainder at the Distance where they are to stand.

In transplanting these Trees, you should always observe never to prune either their Roots or Branches, both which are very injurious to them; nor should you be too busy in lopping or pruning the Branches of these Trees, for it often causes them to decay: But when there is a Necessity of cutting any of their Branches off, it should be done early in September, that the Wound may heal over before the Cold increases, and the Branches should always be cut off quite close to the Trunk, otherwise the Stump which is left will decay, and rot the Body of the Tree.

The best Season for transplanting these Trees, is so soon as the Leaves begin to decay; at which time, if they are carefully taken up, and

and their Branches preserv'd intire, there will be little Danger of their succeeding, although they are eight or ten Years old, as I have several times experienc'd.

This Tree delights in a firm, rich, loamy Soil, or such as is inclinable to Chalk or Marle, and will thrive very well in stony Ground, and on chalky Hills, as may be seen by those large Plantations near *Leatherhead*, *Godstone*, and *Carshalton* in *Surrey*, where are great Numbers of these Trees planted upon the Downs, which annually produce great Quantities of Fruit, to the great Advantage of their Owners; one of which, I have been told, farms the Fruit of his Trees, to those who supply the Markets, for thirty Pounds per Annum.

The Distance these Trees should be plac'd, ought not be less than forty Feet, especially if regard be had to their Fruit; though when they are only design'd for Timber, if they stand near it promotes their upright Growth. The Black *Virginian Walnut* is much more inclinable to grow upright than the common Sort, and the Wood being generally of a more beautiful Grain, renders it preferable to that, and better worth cultivating. I have seen some of this Wood which hath been beautifully vein'd with Black and White, which when polish'd, has appear'd at a Distance like vein'd Marble. This Wood is greatly esteem'd by the Cabinet-Makers for Inlaying, as also for Bedsteads, Stools, Tables and Cabinets, and is one of the most durable Woods for those Purposes yet known, it being rarely infected with Insects of any kind, (which may proceed from its extraordinary Bitterness): But it is not proper for Buildings of Strength, it being of a very brittle Nature, and mighty subject to break very short, though it commonly gives notice thereof by its Crackling some time before it breaks.

The general Opinion, That the beating of this Fruit improves the Trees, I do not believe, since in the doing of this, the younger Branches are generally broken and destroy'd: But as it would be exceeding troublesome to gather it by Hand, so in beating it off, great Care should be taken that it be not done with Violence, for the Reason before assign'd. In order to preserve the Fruit, it should remain upon the Trees till 'tis thorough ripe; when it should be beaten down, and laid in Heaps for two or three Days; after which they should be spread abroad, when, in a little Time, their Husks will easily part from the Shells: Then you must dry them well in the Sun, and lay them up in a dry Place, where Mice or other Vermin cannot come to them: In which Place they will remain good for four or five Months.

NUX VESICARIA; vide *Staphylodendron*.

NYMPHÆA; [is so call'd, because it grows in Water, which the Poets feign to be the Residence of the *Nymphs*.] The Water-Lily.

The Characters are;

The Flower consists of several Leaves, which expand in form of a Rose; out of the Flower-cup arises the Pointal, which afterwards becomes an almost globular Fruit, consisting of many Cells, fill'd with Seeds, which are, for the most part, oblong.

The Species are;

1. **NYMPHÆA**; *alba*, major. C. B. P. The great white Water-Lily.

2. **NYMPHÆA**; *lutea*, major. C. B. P. The great yellow Water-Lily.

3. **NYMPHÆA**; *lutea*, minor, *flore fimbriato*. J. B. The lesser yellow Water-Lily, with a fring'd Flower.

There are some other Species of this Plant, all of which are Natives of deep standing Waters, and therefore not to be cultivated in any other Places.

The best Method to propagate these Plants, is, to procure some of their Seed-Vessels just as they are ripe and ready to open: These should be thrown into Canals, or large Ditches of Standing-water, where the Seeds will sink to the Bottom; and the following Spring the Plants will appear floating upon the Surface of the Water, and in June and July will produce their beautiful large Flowers: When they are once fix'd to the Place, they will multiply exceedingly, so as to cover the whole Surface of the Water in a few Years.

In some small Gardens I have seen these Plants cultivated in large Troughs of Water, where they have flourish'd very well, and have annually produc'd great Quantities of Flowers: But as the Expence of these Troughs is pretty great, (their Insides requiring to be lin'd with Lead to preserve them) so there are few People who care to be at that Charge.

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OAK; vide *Quercus*.

OCTOBER. The Weather in this Month is very often favourable, which gives a great Opportunity to the Gardener for planting of Trees, and putting in his Flower-Roots for the succeeding Spring: But sometimes it happens that the Frost sets in early in this Month, which occasions a great deal of Trouble to get his tender Plants shelter'd, and his Winter Fruits gather'd and laid up for Use; so that, in all these Particulars, the Gardener must be directed by the Difference of the Seasons.

Work to be done in the Kitchen-Garden
this Month.

Continue to earth up *Celery* and *Chardons*, to blanch 'em; observing always to do it in dry Weather; and tye up *Endive* to blanch at the same time. Those *Asparagus-Beds* which were not dress'd the last Month, should now be done by cutting down the Haulm, and hoeing

hoeing the Weeds from off the Beds into the Alleys; which should be dug, and the Weeds buried therein, laying the Earth of the Alleys upon them; as is directed under the Article of *Asparagus*.

Transplant *Brown Dutch, Imperial, Cabbage,* and *Silesia Lettuces* under warm Walls or Hedges to remain the Winter; and at the same time plant some of the *Silesia, Cos,* and other tender *Lettuces* under Frames, or upon Beds fram'd over with Hoops, so that the Plants may be defended from Frosts, lest those which are planted abroad should be destroy'd.

Plant *Beans* and sow *Peas* in warm Situations for an early Crop, observing to do this in dry Weather.

About the Beginning of this Month you must transplant your *Cauliflower* Plants under Bell and Hand Glasses, for an early Crop; and the others should be planted under Frames, where they may be shelter'd from severe Frost in Winter.

Toward the Latter-end of this Month you should trench the Ground between your *Artichokes*, laying a good Ridge of Earth upon each Row of Roots, in the manner directed under the Article of *Artichokes*: And if the Ground be poor, you should at the same time bury therein some rotten Dung between the Rows.

In dry Weather you should hoe and clean the Weeds from among the *Winter Spinage* which was sown in *July*; for if the Weeds are permitted to grow at this Season, they will spread over the *Spinage*, and rot it.

Weed your Beds of *Onions* which were sown in *July*; and the Beds in which your *Welsh Onions* were sown should also be clear'd from Weeds: But the Earth must not be disturb'd; for altho' those *Onions* do at this Season die to the Surface of the Ground, yet their Roots will abide, and come up early the *January* following.

Sow *Radishes* on warm Borders, for an early Crop, the Beginning of this Month; and transplant your *Cabbage* Plants for good, which are design'd to come early in the succeeding Summer.

You must now sow all Sorts of *Sallet-Herbs* upon moderate Hot-beds, either under Frames, or arch'd over with Hoops, so as that the Frost may be kept from them; otherwise they will be destroy'd thereby, as soon as they appear above-ground. But many of the Kitchen-Gardeners near *London* do sow *Lettuce* and other small Salleting under their Bell-glasses where their *Cauliflower* Plants are planted, observing not to sow these Seeds too near to the Stems of the Plants; and these being drawn off soon, do not in the least prejudice their *Cauliflowers*.

Those Persons who are Lovers of *Mint* in their Winter Sallets, should now plant some of the Roots upon a moderate Hot-bed, which will spring up and be fit for Use in about six Weeks time, and may be continued until the Beds in the open Air do produce.

You may now make Hot-beds for *Asparagus*, which will produce in *December*: But this is only proper for some curious Persons, who do it more for the Variety of having *Asparagus* so much out of its Season, than for any real Use; for the Beds made at this Season do not produce near so much, nor are the Buds half so large or well-colour'd, as those which come in *February*, when the Sun begins to shine with more Strength.

Product of the Kitchen-Garden this Month.

There are yet some late *Artichokes*: But you have *Cauliflowers, Cabbages,* and *Savoy* in Plenty.

Herbs for Soup: *Celery, Beets, Chardons, Parsley,* and most Sorts of Aromatick Herbs.

For Sallets: *Endive, Celery, Chervil, Cresses, Lettuce, Mustard, Radish, Rape, Coriander, Corn Sallet,* &c.

Roots: *Carrots, Parsnips, Turnips, Garlick, Onions, Rocambole, Shalots, Beets, Potatoes, Skirrets, Scorzonera,* &c.

You have also *Spinage, Coleworts, Bore-cole,* and *Mushrooms.*

Work to be done in the Fruit-Garden.

If your Soil be dry, this is the most proper Time for Transplanting all Sorts of Fruit Trees; in doing of which, you should never cut off their Heads until the *Spring*; but you should lay some Mulch upon the Surface of the Ground about their Stems, to prevent the Frost from penetrating to their Roots, which would destroy the young Fibres.

Plant *Gooseberries, Currants, Raspberries,* and *Strawberries*, that they may take Root before the Frost comes on; which Plants do frequently produce Fruit the succeeding Summer, whereas those planted in the *Spring* have seldom Strength enough to produce any until the second Season.

The Beginning of this Month you may prune *Peaches, Nectarines, Apricocks,* and *Vines*; which is a much better Method than to let them remain until the *Spring*, as is the common Practice: For if this be perform'd early in the *Autumn*, their Wounds will heal over before the Weather be cold, and so be less subject to die after the Knife, than when pruned in the *Spring*: Besides, by doing it at this Season, you gain a great deal of Time in the *Spring*, when commonly there is more Business to be done (which must not be avoided) than at any other Season.

Continue also to prune *Pears, Apples, Plums,* and all other hardy Fruit Trees, both against Walls and Espaliers, observing the Rules laid down for the pruning of each Sort, under their several Articles.

Plant Stocks of all Kinds in the Nursery, to receive Buds or Grafts of the several Kinds of Fruits at the proper Season; and preserve Kernels and Stones, (of such Sorts as are recommended for Stocks) in Sand, in a warm Situation, until the *Spring*, when they must be sown.

Fruits in prime, or yet lasting.

You have yet the *Bloody* and *Malacotoon* *Peaches*, *Grapes*, late *Figs*, *Medlars*, *Services*, and *Black Bullace*, as also *Wall-nuts*, *Hazel-nuts*, and *Almonds*.

Peas: The *Doyenné*, *Marquise*, *Messire*, *Jean*, *Beurré de Roy*, *Bergamotte de Suisse*, *Roufflet*, *Verte-longue*, *Long-tail'd Muscat*, *Spanish Boncretien*, *Cresan*, *Swan's Egg*, and some others of less Note.

Apples: *Golden Rennet*, *Autumn Pearmain*, *Calville d'Automne*, *Renette Gise*, *Royal Russet*, *Embroider'd Apple*, with some others.

Work to be done in the Flower-Garden.

At the Beginning of this Month you should finish planting all the Sorts of Flower Roots which are intended to be put into the Ground before Christmas; as *Tulips*, *Crocus's*, *Jonquils*, *Ranunculus's*, *Hyacinths*, *Anemonies*, and such others whose Roots have been preserv'd out of the Ground since their Leaves have been decay'd.

You may also transplant *Hollyhocks*, *Campanula's*, *Columbines*, *Canterbury Bells*, *French Honeysuckles*, *Daizies*, *Polyanthus's*, *Sweet-Williams*, *Pinks*, and most other Fibre-rooted Flowers, which should now be placed in the Borders of the Flower-Garden, where they are to remain for Flowering the succeeding Year.

Transplant all the hardy Sorts of Flowering Shrubs, that they may be well rooted before the Drought of the Spring, which often destroys those which are planted late in the Spring. You may also make Layers of all Sorts of Flowering Trees and Shrubs at this Season.

Your Pots or Cases of Seedling Flowers should now be remov'd into a warm Situation, where they may be shelter'd from cold Winds; but should be expos'd to the full Sun, and screen'd from violent Rains and Snow, by Mats, or some such Covering.

Such Seedling Bulbous-rooted Flowers that remain unremov'd at this Season should be clean'd from Weeds, and some fresh rich Earth spread over the Beds about an Inch thick, which will be of great Service to the Roots.

Remove your choice *Carnations* under Cover, where they may be protected from great Rains, Snow, and severe Frost: But let 'em have as much free Air as possible when the Weather is mild.

Your Pots of choice *Auricula's* should be now laid down on one Side, to prevent their receiving too much Wet, which will be apt to rot them: But they will endure the Cold extremely well.

Transplant *Flag-leav'd Iris's*, *Peonies*, *Aconites*, and other Knobby-rooted Flowers, which, if remov'd in the Spring, will be apt to decay.

Cleanse all the Borders of the Pleasure-Garden from Weeds, and cut down the Stalks of all such Flowers as have done blowing;

and, if you don't dig the Borders, you must gently stir the Surface of them, and rake 'em over, which will render them handfomer all the Winter-season.

Plants now Flowering in the Pleasure-Garden.

Several Sorts of *Starworts*, *Golden Rods*, and *Sun Flowers*; *Saffron*; two or three Sorts of *Autumnal Crocus's*, *Double Colchicum*, *Yellow Autumnal Narcissus*, *Cyclamens*, *African* and *French Marygold*, *Female Balsamine*, *Marvel of Peru*, *China Pinks*, *Indian Scabious*, *Sweet Sultan*, *Polyanthus's*, *Auricula's*, *Guernsey Lily*, *Heartsease*; and some *Anemonies* which were not taken up in Summer.

Hardy Trees and Shrubs now in Flower.

Arbutus or the *Strawberry Tree*, late *Honeysuckles*, *Althæa Frutex*, *Passion Flower*, *Cytisus Lunatus*, *Laurustinus*, *Montbly Rose*, *Musk Rose*, *Cinquefoil Tree*, *Sbrubby St. Peter's-wort*, with some others.

Work to be done in the Green-house and Stove.

At the Beginning of this Month you must carry your *Orange Trees*, *Geraniums*, *Double Nasturtium*; *Spanish*, *Azorian*, *Yellow Indian*, and *Ilex-leav'd Jasmines*, with other of the less-tender Exoticks, into the Green-house, observing always to place them near the Windows at their being first carry'd in, as also to let them have as much Air as possible until the Season grows colder, when the other harder Kinds must be brought in; until which Time you should never place the Plants in Order in the House.

You should also at this Time make fresh Hot-beds of Tanners Bark in the Stove, into which the tenderest Exoticks should be plung'd for the Winter-season: But you should observe to remove them in a fine warm Day; and such of them whose Leaves are infected with Insects, or have contracted Filth, should now be wash'd clean, otherwise the Infection will spread to other Plants, and be of ill Consequence to them.

Toward the Latter-end of the Month, as you find the Nights grow cold, you must begin to make Fires in the Stoves: But this must be done with great Caution; for if you make the Heat too great, it will cause the Plants to make an Attempt to shoot; when the Season being too far advanc'd to permit them, their Leaves will, many times, decay and fall off.

The *Anana* Plants must now be removed out of the Bark-beds into the Stove, placing them near the Fire, that they may enjoy the greatest Share of Heat: But you should not forget to refresh them pretty often with Water that hath stood twenty-four Hours in the Stove, so as to acquire a Heat proportionable to the Air of the House; for if you permit their Fibres to grow dry, it will greatly weaken the Plants, and occasion their Fruit to be very small.

Plants

Plants now Flowering in the Green-house and Stove.

Several Sorts of *Geraniums* and *Ficoides's*, *Leonurus*, *Chrysanthemums*, *Double Nasturtium*; *Spanish*, *Yellow Indian*, *Azorian*, and *Ilex-leav'd Jasmines*; *Anemonospermus*, *Persian Cyclamens*, *Canary Campanula*, *Cassia Babamensis*, *Sensitive* and *Humble Plants*, *Alaternoides erice folio*, *Senecio folio retuso*, *Opuntia's*; several Sorts of *Aloes*, *Euphorbium nerii folio*, with some others.

OCULUS CHRISTI; vide *Horminum Sylvestre*.

OENANTHE, [*οἰανθε*, of *οἶνος* a Vine, and *ἄνθος* a Flower. The Antients call'd any Plant *OEnanthe* that flower'd at the same time with the Vine, or whose Flowers had the same Odour.] *Water Dropwort*.

The Characters are;

It is an umbelliferous Plant, whose Flower consists of many Heart-shap'd Leaves, which expand in Form of a Rose: The Ovary is fix'd to the Top of the Empalement, which turns to a Fruit compos'd of two oblong Seeds, that are gibbous and streak'd on one Side, and plain on the other, ending, as it were, in some Prickles, the middlemost of which is stronger than the rest.

The Species are;

1. OENANTHE; *cicutæ facie* *Lobelii*. *Park. Theat.* Hemlock Dropwort.

2. OENANTHE; *aquatica*, C. B. P. *Water Dropwort*.

There are several other Species of this Plant, some of which are Natives of *England*; but as they are not at present useful, nor of any Beauty, I shall omit enumerating them in this Place.

The first of those here mention'd is very common by the Side of the *Thames* on each Side *London*, as also by the Sides of large Ditches and Rivers in divers Parts of *England*: This Plant commonly grows four or five Feet high with strong-jointed Stalks, which being broke, do emit a yellowish foetid Juice: The Leaves are somewhat like those of the common *Hemlock*, but are of a lighter-green Colour: The Roots divide into four or five large taper ones, which, when separated, have some Resemblance to *Parsnips*; for which some ignorant Persons have taken and boil'd them, whereby Themselves and Family have been poison'd.

The poisonous Quality of this Plant hath led some Persons to believe it is the *Cicuta* of the Antients: But, according to *Wepfer*, the *Sium alterum Olusatris facie* of *Lobel* is what the Antients call'd *Cicuta*, as may be seen at large in *Wepfer's Book de Cicuta*.

The second Sort is very common in moist Soils, and by the Sides of Rivers in divers Parts of *England*: This is not suppos'd to be near so strong as the first, but is of a poisonous Quality.

All the Sorts of these Plants do naturally grow in moist Places; so that whoever hath a mind to cultivate them should sow their Seeds

soon after they are ripe in *Autumn*, upon a moist Soil, where they will come up, and thrive exceedingly the following *Summer*, and require no farther Care but to clear them from Weeds.

OLEA, [of *ἔλαιον*.] The Olive.

The Characters are;

The Leaves are, for the most part, oblong and ever-green; the Flower consists of one Leaf; the lower Part of which is hollow'd, but the upper Part is divided into four Parts; the Ovary, which is fix'd in the Center of the Flower-cup, becomes an Oval, soft, pulpy Fruit, abounding with a fat Liquor, enclosing a hard rough Stone.

The Species are;

1. OLEA; *sativa*. C. B. P. The manur'd Olive.

2. OLEA; *Africana*, *folio longo, lato, supra atroviridi splendente, infra pallide viridi*. *Boerb. Ind.* African Olive, with a broad long Leaf, of a shining dark-green Colour on the upper-side, but of a paler-green underneath.

3. OLEA; *Africana*, *folio Buxi, crasso, atroviridi, lucido, cortice albo, scabro*. *Boerb. Ind.* The African Box-leav'd Olive.

4. OLEA; *minor, Lucensis, fructu odorato*. *Tourn.* The Luca Olive.

5. OLEA; *fructu majori, carne crassa*. *Tourn.* Olive, with a larger Fruit, having a thicker Pulp.

6. OLEA; *Sylvestris, folio molli incano*. C. B. P. The Oleaster or Wild Olive, with soft hoary Leaves.

These five first Sorts are preserv'd in the Gardens of the Curious, where they are planted either in Pots or Cafes, and remov'd into the Green-house in the Winter, with *Oranges*, *Myrtles*, &c. but they are most of them hardy enough to endure the Cold of our ordinary Winters in the open Air, provided they are planted upon a dry Soil, and in a warm Situation; tho' in severe Winters they are often demolish'd, or at least lose their Heads, or are kill'd to the Surface; but this is what they are liable to in the South Parts of *France*, in which Country these Trees abound; and yet in very sharp Winters are most of them destroy'd. There was a Parcel of these Trees growing in the Gardens of *Cambden-House* near *Kensington* a few Years since, which were seven or eight Feet high, and in some good Seasons did produce very good Fruit: These were planted against a South-Wall, but were permitted to grow up rude without pruning, or fastening to the Wall, (which they do by no means care for); and during the Time they were below the Top of the Wall, they thrived very well; but after their Heads were gotten above the Wall, the North-Winds did usually every Winter greatly prejudice them, and I believe the last hard Winter [1709.] did intirely demolish them.

These Plants may be propagated by laying down of their tender Branches, (in the manner practis'd for other Trees) which should remain undisturb'd two Years; in which time they will have taken Root, and may then be taken

taken off from the old Plants, and transplanted either into Pots fill'd with fresh light Earth, or into the open Ground in a warm Situation. The best Season for transplanting them is the Beginning of *April*; when you should, if possible, take the Opportunity of a moist Season, and those which are planted in Pots, should be plac'd in a shady Part of the Green-house until they have taken Root; but those planted in the Ground should have Mulch laid about their Roots, to prevent the Earth from drying too fast, and now and then refresh'd with Water, but you must by no means let them have too much Moisture, which will rot the tender Fibres of their Roots, and destroy the Trees. When the Plants have taken fresh Root, those in the Pots may be expos'd to the open Air, with other hardy Exoticks, with which they should be hous'd in Winter, and treated as *Myrtles* and other less tender Trees and Shrubs; but those in the open Air will require no farther Care until the Winter following, when you should mulch the Ground about their Roots, to prevent the Frost from penetrating deep into it: And if the Frost should prove very severe, you should cover them with Mats, which will defend them from being injur'd thereby; but you must be cautious not to let the Mats continue over them after the Frost is past, lest by keeping them too close, their Leaves and tender Branches should prove mouldy for want of free Air, which will be of as bad Consequence to the Trees as if they had been expos'd to the Frost, and many times worse, for it seldom happens, if they have taken much of this Mould, or have been long cover'd, so that it has enter'd the Bark, that they are ever recoverable again; whereas it often happens, that the Frost only destroys the tender Shoots, but the Body and larger Branches remaining unhurt, do put out again the succeeding Spring.

These Trees are generally brought over from *Italy* every Spring, by the Persons who bring over the *Oranges*, *Jasmines*, &c. from whom they may be procur'd pretty reasonable, which is a better Method than to raise them from Layers in this Country, that being too tedious; and those which are thus brought over, have many times very large Stems, to which Size young Plants in this Country would not arrive in ten or twelve Years Growth. When you first procure these Stems, you should (after having soak'd their Roots twenty-four Hours in Water, and clean'd them from the Filth they have contracted in their Passage) plant them in Pots fill'd with fresh, light, sandy Earth, and plung'd into a moderate Hot-bed, observing to screen them from the Violence of the Sun in the Heat of the Day, and also to refresh them with Water, as you shall find the Earth in the Pots dry. In this Situation they will begin to shoot in a Month or six Weeks after; when you should let them have Air in Proportion to the Warmth of the Season: And after they have made pretty good Shoots, you should inure them to the open Air by degrees; into which they should be remov'd, placing them in a Situation where

they may be defended from strong Winds: In this Place they should remain till *October* following; when they must be remov'd into the Green-house, as was before directed. Having thus manag'd these Plants until they have acquir'd strong Roots, and made tolerable good Heads, you may draw them out of the Pots, preserving the Earth to their Roots, and plant them in the open Air in a warm Situation, where you must manage them as was before directed for the young ones, and these will in two or three Years produce Fruit, provided they do well. The *Luca* and *Bex-leav'd Olives* are the hardiest, for which Reason they should be prefer'd to plant in the open Air, but the first Sort will grow to be the largest Trees.

The *Oleaster* is very hardy, and will endure the severest Cold of our Climate, provided it have a dry Soil, and is not too much expos'd to the cold Winds. This will grow to the Height of sixteen or eighteen Feet, and make a large Head; and if planted among other Exotick Trees in Wilderness-Quarters, will greatly add to their Variety by its Silver-colour'd Leaves; and during the Season of its Flowering, (which is in *June*) it perfumes the circumambient Air to a great Distance, tho' the Flowers are very small, and of little Beauty. This sometimes produces Fruit in *England*, when the Trees are pretty old, but it often happens, that if they bear any Quantity of Fruit, they die soon after.

This Tree may be propagated by laying down the tender Branches, which will take Root in one Year's time; at which time they may be taken off from the old Plants, and plac'd where they are to remain, for they do not care to be often transplanted. The best Season for removing them is the latter End of *March*, or the Beginning of *April*, just before the Leaves come out; when you should also observe to mulch the Ground about their Roots, and refresh them with Water, as they may require it; and after they have taken good Root in the Ground, they will grow very quick, and in two or three Years will produce Flowers.

OMPHALODES, [of *ὀμφαλός*, a Navel, and *ἄσπερ* Shape, because the Calix is hollow'd like the human Navel.] Venus Navel-wort.

The Characters are;

The Flower consists of one Leaf, which expands in a circular Order, and is cut into several Segments; the Pointal, which rises in the Middle of the Flower, becomes a Fruit, compos'd of four bollow, umbilicated Capsules, somewhat resembling a Basket; in each of which is contain'd one almost flat Seed adhering to the Placenta, which is pyramidal and four-corner'd.

The Species are;

1. OMPHALODES; *Lusitanica*, *lini folio*. Tourn. Venus Navel-wort; vulg.
2. OMPHALODES; *Lusitanica*, *elatio*r, *Cynoglossi folio*. Tourn. Taller Portugal Navel-wort, with a Hound's-tongue Leaf.

3. OMPHA-

3. *OMPHALODES*; *pumila, verna, Symphiti folio. Tourn.* Low Vernal Venus Navel-wort, with a Comfrey-leaf, or Lesser Borage.

The first of these Plants hath been a long Time in the *English* Gardens. The Seeds of this kind are sold in the *London* Shops, as a Dwarf annual Flower, to be us'd for Edgings; for which Purpose it is by no means proper, for it often happens, that not a tenth Part of the Seeds do grow, though they were sav'd with all possible Care, so that the Plants will be very thin, and in Patches; but however, it is a pretty Ornament to the Borders of the Pleasure Garden, if sown in Patches, as hath been directed for the *Dwarf Lychnis*, and other annual Plants of the same Growth, amongst which this Plant makes a pretty Variety. The Seeds of it should be sown in *Autumn*, soon after they are ripe; at which Season they will come up very well, (whereas those sown in the *Spring* do seldom succeed) and the Plants will abide the Cold of our ordinary *Winters*, and will flower early the succeeding *Spring*, from which Plants you will have good Seeds in *July*; but those sown in the *Spring* do very often fail of ripening Seeds.

The second Sort is only in some curious Botanick Gardens at present, though it is equally as hardy as the first, and must be treated in the same Manner. This grows taller, and hath broader Leaves than the first, in which Respects the only Difference between them consists.

The third Sort is an abiding Plant, and multiplies very fast by its trailing Branches, which take Root at their Joints as they lie upon the Ground, and may be taken off, and transplanted to make new Plants. These require a moist Soil and a shady Situation, where they will thrive exceedingly, and produce great Quantities of pretty blue Flowers early in the *Spring*, for which it is chiefly valued.

ONIONS; *vide* Cepa.

ONOBRYCHIS; [of *ὄν* an *Aff*, and *βρύχω* to make a Noise or Bray, because the Scent of this Plant makes *Affes* bray; or because when *Affes* eat these Husks, they are said always to bray.] Cock's Head, or Saint-Foin.

The Characters are;

It hath a papilionaceous Flower, out of whose Empalement rises the Pointal, which afterwards becomes a crested Pod, which is sometimes rough and full of Seeds, shap'd like a Kidney; to which may be added, the Flowers grow in a thick Spike.

The Species are;

1. *ONOBRYCHIS*; *foliis viciæ, fructu echinato major, floribus dilutè rubentibus.* C. B. P. Greater Cock's-head, with Vetch Leaves, rough Fruit, and pale-red Flowers.

2. *ONOBRYCHIS*; *foliis viciæ, fructu echinato major, floribus eleganter rubentibus.* C. B. P. Greater Cock's-head, with Vetch Leaves, rough Fruit, and beautiful red Flowers.

3. *ONOBRYCHIS*; *fructu echinato minor.* C. B. P. Smaller Cock's-head, with rough Fruit or Medick Vetchling.

The two first are Varieties which only differ in the Colour of their Flowers, the same Seeds often producing both Sorts, tho' sav'd from one Plant: As there is also another Variety with a white Flower, which doth come from the same Seed, so that they may pass for one Plant.

This is an abiding Plant, which if sown upon a dry, gravelly, or chalky Soil, will continue eighteen or twenty Years; but if it be sown upon a deep, light, moist Soil, the Roots will run down into the Ground, and in the Winter Season the Moisture will rot the Roots, so that it seldom lasts above two Years in such Places.

This is esteem'd one of the best Sorts of Fodder for most Cattle, and is a great Improvement to shallow, chalky Hills, upon which it succeeds better than in any other Soil, and will continue many Years; and the Roots of this Plant, when plough'd in, doth greatly enrich the Ground.

The best Season for sowing of this Seed is in the Beginning or Middle of *March*, (according as the Season is early or late) observing always to do it in dry Weather, otherwise the Seed will be apt to burst with Moisture, and so never come up. These Seeds being large, there will require a greater Quantity to sow an Acre: The common Allowance is four Bushels to an Acre, but I would not advise above three at most: And if this Seed were sown in Rows, (in the manner directed for the *Medica*) it would be a great Improvement to the Plants; for when they have Room enough they are very subject to branch out on every Side, and become very strong; so that when they are in Rows, that the Ground between them can be stir'd with a Hand-Plough, it will cause them to shoot much stronger than when they grow so close that there can be no Culture bestow'd on them.

I have taken up Roots of this kind, where they have grown singly, and kept clear from Weeds, whose Shoots have spread near two Feet wide, and were much stronger than those which grew nearer together upon the same Soil.

There are some Persons who recommend the sowing *Oats* or *Barley* with this Seed, but that is a very bad Method, for what is gain'd from the Crop of *Corn* will be doubly lost in the *Saint Foin*; and this generally holds true in most Sorts of Grass Seeds, for the *Corn* growing over it, doth so weaken the Crop beneath, that it scarcely recovers its Strength in a Year's Time after.

The Ground in which this Seed is sown, should be well ploughed and made very fine; and if you sow it in Rows, the Drills should be made eighteen Inches asunder, and about ten Inches deep, in which the Seed should be sown indifferently thick; for if the Plants come up too close, it will be very easy to hoe them out, so as to leave the remaining ones six or eight Inches asunder; for the Ground should be hoed, after the Plants are come up, to destroy the Weeds, which if suffer'd to grow, would soon over-bear the young ones, and

destroy them; but when the Plants have obtain'd Strength, they will prevent the Weeds from growing up amongst them.

The first Year after sowing, you should by no Means feed it down, for the Crown of the Roots being then young and tender, the Cattle would eat it so low as to intirely destroy the Roots; and if large Cattle were let in upon it, they would trample it down so much as to prevent its shooting again: Therefore the first Year it should be remov'd, which should be done when it is in Flower, being careful to turn it often, that it may the sooner dry and be remov'd; for while it continues upon the Ground, it greatly retards the Roots from shooting again.

The Time when this Crop will be fit to cut the first Year, is toward the latter End of July or the Beginning of August: After this is clear'd off, the Roots will soon shoot again, and by the End of September (provided the Season be favourable) there will be a fine Crop fit for feeding: At which Time, or soon after, you may turn in Sheep, which will, in eating down the Grass, enrich the Ground with their Dung, whereby the Roots will be greatly strengthened; but you should not suffer them to remain too long upon it, lest, as I before observ'd, they should eat it down too low, which would destroy the Roots; nor should they ever be suffer'd to remain upon it longer than the Middle of March; after which Time it should be let grow for a Crop, which will be fit to cut the latter End of May; and if you do not feed it, there will be a second Crop by the End of July following, so that you may have two Crops every Year, besides the Advantage of feeding it down in Winter and Spring; and if you observe to stir the Ground betwixt the Rows, after every Cutting, (as was directed for the *Medica*) it will be of great Service to the Roots, and occasion the Shoots to be much stronger than if wholly neglected, as is the common Practice.

This Sort of Hay is excellently good for Horses, and is esteem'd one of the best Sorts of Food for most Cattle, especially in the Spring, there being no Danger attending it, as there is in Clover, and some other Sorts of Fodder; it breeds abundance of Milk; and the Butter that is made of it is very good.

And altho' it is so common in many Parts of England, yet a few Plants of the deep-red flower'd Sort, when dispos'd in large Borders of the *Pleasure-Garden*, do afford an agreeable Variety: The Flowers, which are of a beautiful red Colour, being collected into a long Spike, and continuing a long time in Beauty, do make a very pretty Mixture amongst other Flowers in the Borders of large Gardens, where there is Room; and the Roots will abide several Years without renewing, requiring very little Culture, being extreme hardy, in respect to Heat or Cold, provided they are planted upon a dry Soil.

The third Sort is Annual; nor are the Flowers so beautiful as those of the former Sort, for which Reason it is seldom cultivated, except in Botanick Gardens, for Variety:

This may be sown in the Beginning of March upon a light fresh Soil, where the Plants will come up in April, and will require no further Care but to clear 'em from Weeds: The Seeds will ripen in August, when they should be gather'd, and preserv'd for sowing the succeeding Spring.

OPULUS: The Gelder Rose.

The Characters are;

The Leaves are like those of the Maple-Tree: The Flowers consist of one Leaf, which expands in a circular Rose Form, and is divided at the Top into five Parts; these are collected (for the most part) in Form of an Umbel, the largest of which grow on the Outside, and are barren; but those in the Middle are fruitful, producing red Berries, in each of which is contain'd one flat Heart-shap'd Seed.

The Species are;

1. OPULUS; *Ruelli*. Marsh Elder, or Gelder Rose, with flat Flowers.

2. OPULUS; *flore globoso*. Tourn. The Gelder, or Gelderland Rose.

3. OPULUS; *flore globoso, folio variegato*. The Gelder Rose, with strip'd Leaves.

The first of these Plants is very common in moist Woods in divers Parts of England, but is seldom cultivated in Gardens; though, if the Soil be moist in which this Tree be planted, it will afford a very agreeable Prospect, both in the Season when it is in Flower, and also in the Autumn when the Fruit is ripe, which generally grows in large Clusters, and is of a beautiful red Colour: So that where a Wilderness or other Plantation of Flowering Trees is design'd, and the Ground be moist, this and the next are two of the most proper Trees for such Purposes; these thriving much better, and will produce their Flowers larger and in greater Quantities, than when they are placed in a dry Situation.

The second Sort is very common in old Gardens in most Parts of England: This produces only barren Flowers, which being all very large, are produced in a globular Form, so that, at a Distance, they resemble Snow-balls; whence the People in some Countries give it the Name of *Snow-ball Tree*. This Difference was at first accidental, as is the Case of all double Flowers which commonly arise from Seeds; and tho' these are not productive of Fruit, yet for the Sake of their Flowers they are much more esteem'd than the single Sort by the Gardeners.

The strip'd Sort is also an Accident, occasion'd by an Obstruction of the Juices, as is the Case of all variegated Plants: This is preserv'd as a Curiosity by such as are Lovers of strip'd Trees and Plants, but must not be planted in a rich Soil, which would cause them to grow vigorously, whereby they would be in Danger of becoming plain again.

All these Sorts may be propagated either from Suckers or by laying down their Branches, which will take Root in a Year's time; when they may be taken off from the old Plants, and

and transplanted either into a Nursery, where they may be train'd up for two or three Years, or plac'd where they may remain for good. The best Time to remove these Trees, is at *Michaelmas*, as soon as their Leaves begin to decay, that they may be well rooted before the Drought of the next *Spring* comes on, which is often destructive to such as have been newly transplanted, if they are not carefully attended with Water.

They are extreme hardy, and will endure the severest Cold of our most Northern Situations, and are only impatient of great Heat and Drought, so that they are very proper to plant in very cold Soils and Places which are greatly expos'd to the North Winds, where few other Shrubs will thrive so well. They will grow to the Height of twelve or fourteen Feet, and if reduc'd to regular Heads, are very ornamental during the Season of Flowering; and their Flowers are very proper to intermix with *Peonies* and other large Flowers, for Basons and Flower-pots to adorn Halls and Chimnies. Their Season of Flowering is in *May*, though their Flowers do sometimes continue in Beauty a great Part of *June*, especially if the Weather prove cool and moist.

OPUNTIA: [This Plant is call'd *Opuntia*, because *Theophrastus* writes, that it grows about *Opuntium*.] The Indian Fig.

The Characters are;

The Flower consists of many Leaves, which expand in Form of a Rose, having a great Number of Stamina in the Center, which grow upon the Top of the Ovary: The Ovary afterwards becomes a fleshy umbilicated Fruit, with a soft Pulp inclosing many Seeds, which are, for the most Part, angular.

The Species are;

1. **OPUNTIA**; *vulgô, Herbariorum. J. B.* The Common Indian Fig of the Botanists.

2. **OPUNTIA**; *minima, folio subrotundo. Tourn.* Least Indian Fig, with roundish Leaves.

3. **OPUNTIA**; *folio oblongo, media. Tourn.* Middle Indian Fig, with an oblong Leaf, commonly call'd The Cochineal Fig-tree.

4. **OPUNTIA**; *folio minori, rotundiori & compressiori. Tourn.* Indian Fig, with a smaller, rounder, and flatter Leaf.

5. **OPUNTIA**; *major, validissimis spinis munita. Tourn.* The greater Indian Fig, armed with very strong Prickles.

6. **OPUNTIA**; *maxima, folio spinoso, latissimo & longissimo. Tourn.* The largest Indian Fig, with a very broad and long prickly Leaf.

7. **OPUNTIA**; *folio spinoso, longissimo & angusto. Tourn.* Indian Fig, with a very long, narrow, prickly Leaf.

8. **OPUNTIA**; *latifolia, crassiori folio, spinis albis numerosis armata. Boerb. Ind.* Indian Fig, with a broad thick Leaf arm'd with many white Spines.

9. **OPUNTIA**; *Curassavica, minima. H. Beaun.* The smallest Indian Fig from *Curacao*, commonly call'd The Pin-Pillow.

10. **OPUNTIA**; *Americana, arbor excelsa, foliis reticulatis, flore flavescente. Plum. Ame-*

rican Indian Fig, which grows to be a tall Tree, with netted Leaves and a yellowish Flower.

II. **OPUNTIA**; *folio plano, graebro, Sclerpendria. Boerb. Ind.* Indian Fig, with a plain smooth Leaf, like Spleenwort.

The first of these Plants hath been a long time in *England*, and is the most common Sort in *Europe*: This, Mr. Ray and Dr. Robinson observ'd growing wild in the Kingdom of *Naples*, by the Sides of the Highways, on the Sides of the Mountains, and among Rocks in great abundance; but in these Northern Parts of *Europe*, it is generally preserv'd in Green-houses with other Exotick Plants; tho' I have planted it under a warm Wall in a very dry Soil, where it has continu'd for five Years, and endured the severest of our Cold without any Cover, and has produc'd a greater Quantity of Flowers and Fruit than those which were hous'd: So that the Cold is not so great an Enemy to this Plant as Wet, which if suffer'd to lie long upon it, or given in too large Quantities to the Root, will destroy it in a short Time.

The other Sorts are much tenderer, being all of them Natives of the warm Parts of the *West-Indies*. These are some of them so tender as not to be preserv'd without the Assistance of a Stove (especially the ninth and eleventh Sorts) in any tolerable Degree of Health; for if they have not some additional Warmth to the Air of the House in Winter, their Stems will shrivel and look yellowish and wither'd.

These Plants may all be propagated by cutting off their Branches at the Joints, during any of the Summer Months; which should be laid in a warm dry Place for a Fortnight, that the wounded Part may be heal'd over, otherwise they will rot with the Moisture which they imbibe at that Part, as is the Case with most other Succulent Plants. The Soil in which these Plants are planted, should be compos'd after the following Manner, viz. One third of light fresh Earth from a Pasture, a third Part Sea-sand, and the other Part should be one half rotten Tan, and the other half Lime-rubbish: These should be well mix'd, and laid in a Heap three or four Months before it be us'd, observing to turn it over at least once a Month, that the several Parts may be well united; then you should pass it through a rough Screen, in order to separate the largest Stones and Clods, but by no means sift it too fine, which is a very common Fault: Then you should reserve some of the smaller Stones and Rubbish to lay at the Bottom of the Pots, in order to keep an open Passage for the Moisture to drain off; which is what must be observ'd for all Succulent Plants, for if the Moisture be detain'd in the Pots, it will rot their Roots, and destroy the Plants.

When you plant any of the Branches of these Plants, you should plunge the Pots into a moderate Hot-bed, which will greatly facilitate their taking Root: You should also refresh them now and then with a little Water, but be very careful not to let them have too much,

much, or be too often water'd, especially before they are rooted: When the Plants begin to shoot, you must give them a large Share of Air by raising the Glasses, otherwise their Shoots will draw up so weak as not to be able to support themselves; and after they have taken strong Root, you should inure them to the Air by degrees, and then remove them into the Stove where they should remain, placing them near the Glasses, which should always be open'd in warm Weather, so that they may have the Advantage of a free Air, and yet be protected from Wet and Cold.

During the Summer-season, these Plants will require to be often refresh'd with Water, but it must not be given to them in large Quantities, lest it rot them; and in Winter they should have very little Water given to them, but that should be proportion'd to the Warmth of the Stove, for if the Air be kept very warm, they will require to be often refresh'd, otherwise their Branches will shrink; but if the House be kept in a moderate Degree of Warmth, they should have very little, for Moisture at that Season will rot them very soon.

The Heat in which these Plants thrive best is the temperate Point, as mark'd on Mr. *Fowler's Thermometers*; for if they are kept too warm in Winter, it causes their Shoots to be very tender, and thereby very liable to decay if not duly attended. Those Sorts which are inclinable to grow upright, should have their Branches supported with Stakes, otherwise their Weight is so great, that it will break them down.

These Plants are by most People expos'd to the open Air in the Summer-season, but they thrive much better if they are continu'd in the Stoves, provided the Glasses be kept open, so that they may have free Air; for when they are set abroad, the great Rains which generally fall in Summer, together with the unsettled Temper of the Air in our Climate, does greatly diminish their Beauty by retarding their Growth, and sometimes in wet Summers they are so replete with Moisture as to rot in the succeeding Winter; nor will those Plants which are set abroad, (I mean the tender Sorts) produce their Flowers and Fruit in such Plenty as those which are constantly preserv'd in the House.

The third Sort is suppos'd to be the Plant upon which the *Cochineal-Fly* breeds: These deposite their Eggs in the Center of the Flowers, upon the Crown of the Ovary; and when they are hatch'd, the young Insects feed upon the Fruit, which is of a deep-red Colour within, and if eaten by Men, colours their Urine as red as Blood; which has often frighted Strangers who have eaten of the Fruit, when they have thought it was real Blood which they voided, tho' there are no ill Effects attend it.

The ninth and eleventh Sorts are less common than the others, and are rarely seen but in very curious Gardens: These are the tenderest of them all, and should be plac'd in a warm Part of the Stove in Winter, but must

have very little Water given them at that Season, and in Summer must always be kept in the House, for they will not bear the open Air in the Heat of *Summer*, which is seldom very regular in this Country.

ORANGE; *vide* Aurantium.

ORCHARD: In planting of an Orchard, great Care should be had to the Nature of the Soil, that such Sorts of Fruit as are adapted to grow upon the Ground intended to be planted, may be chosen, otherwise there can be little Hopes of their succeeding; and it is for want of rightly observing this Method, that we see in many Countries Orchards planted which never arrive to any tolerable Degree of Perfection, their Trees starving, and their Bodies are either cover'd with Moss, or the Bark cracks and divides, both which are evident Signs of the Weakness of the Trees; whereas, if instead of Apples, the Orchard had been planted with Pears, Cherries, or any other sort of Fruit to which the Soil had been adapted, the Trees might have grown very well, and produc'd great Quantities of Fruit.

As to the Position of an Orchard, (if you are at full Liberty to choose) a rising Ground, open to the *South-East*, is to be preferr'd; but I would by no means advise to plant upon the Side of a Hill, where the Declivity is very great, for in such Places the great Rains do commonly wash down the better Part of the Ground, whereby the Trees would be depriv'd of proper Nourishment: But where the Rise is gentle, it is of great Advantage to the Trees, by admitting the Sun and Air between them better than it can upon an intire Level, which is an exceeding Benefit to the Fruit, by dissipating Fogs, and drying up the Damps, which when detain'd amongst the Trees, do mix with the Air and render it rancid: If it be defended from the *West*, *North*, and *East* Winds, it will also render the Situation still more advantageous; for it is chiefly from those Quarters that Fruit-Trees receive the greatest Injury: Therefore, if the Place be not naturally defended from these by rising Hills, (which is always to be preferr'd); then you should plant large-growing Timber-Trees at some Distance from the Orchard, to answer this Purpose.

You should also have a great Regard to the Distance of planting the Trees, which is what few People have rightly consider'd; for if you plant them too close, they will be liable to Blights, and the Air being hereby pent in amongst them, will cause the Fruit to be ill-tasted, having a great Quantity of damp Vapours from the Perspiration of the Trees, and the Exhalations from the Earth mix'd with it, which will be imbib'd by the Fruit, and render their Juices crude and unwholesome.

Wherefore I can't but recommend the Method which has been lately practis'd by some particular Gentlemen with very good Success; and that is, To plant the Rows of Trees four-score or a hundred Feet asunder, and the Distance of the Trees in the Rows three-score Feet: The Ground between the Trees they plough and

and sow with Wheat and other Crops, in the same manner as if it were clear from Trees, and they observe their Crops to be full as good as those quite expos'd, (except just under each Tree when they are grown large and afford a great Shade); and by thus ploughing and tilling the Ground, the Trees are render'd more vigorous and healthy, scarcely ever having any Moss or other Marks of Poverty, and will abide much longer, and produce better Fruit.

If the Ground in which you intend to plant an Orchard has been Pasture for some Years, then you should plough in the *Green Sward* the *Spring* before you plant the Trees; and if you will permit it to lie a *Summer* fallow, it will greatly mend it, provided you stir it two or three times, to rot the Sward of Grass, and prevent Weeds growing thereon.

At *Michaelmas* you should plough it pretty deep, in order to make it loose for the Roots of the Trees, which should be planted thereon in *October*, provided the Soil be dry; but if it be moist, the Beginning of *March* will be a better Season.

When you have finish'd planting the Trees, you should provide some Stakes to support them, otherwise the Wind will blow them out of the Ground; which will do them much Injury, especially if they have been planted some Time; for the Ground at that Season being warm, and for the most part moist, the Trees will very soon push out a great Number of young Fibres, which, if broken off by their being displac'd, will greatly retard the Growth of them.

In the *Spring* following, if the Season should prove dry, you should cut a Quantity of green Turf, which must be laid upon the Surface of the Ground about their Roots, turning the Grass downward, which will prevent the Sun and Wind from drying the Ground, whereby the Expence of Watering will be sav'd; and after the first Year they will be out of Danger, provided they have taken well.

Whenever you plough the Ground betwixt these Trees, you must be careful not to go too deep amongst their Roots, lest you should cut them off, which would greatly damage the Trees: but if you do it cautiously, the stirring of the Surface of the Ground will be of great Benefit to them: Tho' you should observe, never to sow too near the Trees, nor suffer any great-rooting Weeds to grow about them, which would exhaust the Goodness of the Soil, and starve 'em.

If, after the Turf which was laid round the Trees be rotted, you dig it gently about their Roots, it will greatly encourage them.

There are some Persons who plant many Sorts of Fruit together in the same Orchard, mixing the Trees alternately: but this is a Method which should always be avoided; for hereby there will be a very great Difference in the Growth of the Trees, which will not only render 'em unsightly, but also render the Fruit upon the lower Trees ill-tasted, by the tall ones over-shadowing them. So that if you are determin'd to plant several Sorts of Fruit on the same Spot, you should observe

to place the largest-growing Trees backward, and so proceed to those of less Growth, continuing the same Method quite through the whole Plantation; whereby it will appear at a Distance in a regular Slope, and the Sun and Air will more equally pass throughout the whole Orchard, that every Tree may have an equal Benefit therefrom.

The Soil of your Orchard should also be mended once in two or three Years with Dung, or other Manure, which will also be absolutely necessary for the Crops sown between: So that where Persons are not inclinable to help their Orchards, where the Expence of Manure is pretty great; yet as there is a Crop expected from the Ground besides the Fruit, they will the more readily be at the Charge upon that Account.

In making choice of Trees for an Orchard, you should always observe to procure them from a Soil nearly akin to that where they are to be planted, or rather poorer, for if you have them from a very rich Soil, and that wherein you plant them is but indifferent, they will not thrive well, especially for four or five Years after planting: So that 'tis a very wrong Practice to make the Nursery, where young Trees are rais'd, very rich, when the Trees are design'd for a middling or poor Soil. The Trees should also be young and thriving; for whatever some Persons may advise to the contrary, yet it has always been observ'd, that tho' large Trees may grow and produce Fruit after being remov'd, they never make so good Trees, nor are so long-liv'd, as those which are planted while young.

These Trees, after they are planted out, will require no other pruning but only to cut out dead Branches, or such as cross each other so as to render their Heads confus'd and unsightly: The too often pruning them, or shortening their Branches, is very injurious, especially to *Cherries* and *Stone-Fruit*, which will gum prodigiously, and decay in such Places where they are cut: And the *Apples* and *Pears* which are not of so nice a Nature, will produce a greater Quantity of lateral Branches, which will fill the Heads of the Trees with weak Shoots whenever their Branches are thus shorten'd; and many times the Fruit is hereby cut off, which, on many Sorts of Fruit-Trees, is first produc'd at the Extremity of their Shoots.

It may perhaps seem strange to some Persons, that I should recommend the allowing so much Distance to the Trees in an Orchard, because a small Piece of Ground will admit of very few Trees when planted in this Method: But they'll please to observe, that when the Trees are grown up, they will produce a great deal more Fruit, than twice the Number when planted close, and will be vastly better tasted; the Trees, when placed at a large Distance, being never so much in Danger of Blighting as in close Plantations, as hath been observ'd in *Herefordshire*, the great County for Orchards, where they find that Orchards so planted, or so situated, as that the Air is pent up amongst the Trees, the

Vapours which arise from the Damp of the Ground, and the Perspiration of the Trees, collect the Heat of the Sun, and reflect it in Streams so as to cause what they call a Fire-blast, which is the most hurtful to their Fruits; and this is most frequent where the Orchards are open to the South-Sun.

But as Orchards should never be planted, unless where large Quantities of Fruit are desired, so it will be the same thing to allow twice or three times the Quantity of Ground; since there may be a Crop of Grain of any Sort upon the same Place, (as was before said); so that there is no Loss of Ground: And for a Family only it is hardly worth while to plant an Orchard; since a Kitchen-Garden well planted with Espaliers will afford more Fruit than can be eaten while good, especially if the Kitchen-Garden be proportion'd to the Largeness of the Family: And if Cyder be required, there may be a large Avenue of Apple-Trees extended cross a neighbouring Field, which will render it pleasant, and produce a great Quantity of Fruit; or there may be some single Rows of Trees planted to surround Fields, &c. which will fully answer the same Purpose, and be less liable to the Fire-blasts before-mention'd.

ORCHIS, [*ὄρχις* a Testicle, because the Root of this Plant resembles the Testicles of a Man; or of *ἀπὸ ἔργου*, to have an Appetite after, on account of its being a Provocative to Venery: It is also called, *κυνόκερως*, of *κύν* a Dog, and *ὄρχις* a Testicle.] Satyrion, or Fool-Stones.

The Characters are;

It hath an anomalous Flower, consisting of six dissimilar Leaves, the five uppermost of which are so dispos'd as to imitate in some manner a Helmet; the under one being of many Shapes, beaded for the most part, and tail'd, sometimes representing a naked Man, sometimes a Butter-fly, a Drone, a Pigeon, an Ape, a Lizard, a Parrot, a Fly, and other Things: but the Empalement afterwards becomes a Fruit divided into three Cells, in which are contain'd many small Seeds. To these Notes should be added, The Flowers are collected into a Spike; and the Roots are fleshy, sometimes roundish and double like Testicles, sometimes flat, and in a manner shap'd like a Hand.

The Species are;

1. ORCHIS; *morio mas, foliis maculatis*. C. B. P. The Male Fool-stones.
2. ORCHIS; *Morio femina*. Park. Theat. The Female Fool-stones.
3. ORCHIS; *barbata fatida*. J. B. The Lizard Flower, or Great Goat-stones.
4. ORCHIS; *Pannonica*. 4 Cluff. Hist. Little Purple-flower'd Orchis.
5. ORCHIS; *obscurè purpurea, odorata*. Tourn. Sweet-smelling dark-purple Orchis.
6. ORCHIS; *purpurea, spica congesta pyramidalis*. Raii. Syn. Purple late-flowering Orchis.
7. ORCHIS; *odorata moschata, five Monorchis*. C. B. P. The Yellow Sweet or Musk Orchis.

8. ORCHIS; *spiralis alba odorata*. J. B. Triple Ladies Traces.

9. ORCHIS; *latifolia, biante cucullo, major*. Tourn. The Man Orchis.

10. ORCHIS; *anthropophora, Orcades*. Col. Ec. Man Orchis, with a ferrugineous, and sometimes a green Colour.

11. ORCHIS; *myodes, galea & alis herbidis*. J. B. The common Fly Orchis.

12. ORCHIS; *myodes major*. Park. Theat. The Greater Fly Orchis.

13. ORCHIS; *fuscescens, galea & alis purpurascens*. J. B. The Common Humble Bee Satyrion, or Bee-flower.

14. ORCHIS; *five Testiculus Sphegodes bifido flore*. J. B. Humble Bee Satyrion, with green Wings.

15. ORCHIS; *hermaphroditica, bifolia*. J. B. Butter-fly Satyrion.

16. ORCHIS; *alba bifolia minor, calcar oblongo*. C. B. P. The Lesser Butter-fly Satyrion.

17. ORCHIS; *palmata pratensis latifolia, longis calcaribus*. C. B. P. The Male-handed Orchis, or Male Satyrion Royal.

18. ORCHIS; *palmata pratensis, maculata*. C. B. P. The Female-handed Orchis, or Female Satyrion Royal.

19. ORCHIS; *palmata minor, calcaribus oblongis*. C. B. P. Red-handed Orchis, with long Spurs.

20. ORCHIS; *palmata minor, flore luteo-viridi*. Raii. Syn. Handed Orchis, with a greenish Flower, by some call'd The Frog Orchis.

All these Sorts of Orchis grow wild in several Parts of England; but, for the extreme Oddness and Beauty of their Flowers, deserve a Place in every good Garden: And the Reason for their not being cultivated in Gardens, proceeds from their Difficulty to be transplanted: Tho', this, I believe, may be easily overcome, where a Person has an Opportunity of marking their Roots in their Time of Flowering, and letting them remain until their Leaves are decay'd, when they may be transplanted with Safety: For it is the same with most Sorts of bulbous or fleshy-rooted Plants, which, if transplanted before their Leaves decay, seldom live, notwithstanding you preserve a large Ball of Earth about them; for the extreme Part of their Fibres extend to a great Depth in the Ground, from whence they receive their Nourishment; which if broken or damag'd by taking up their Roots, they seldom thrive after; for tho' they may sometimes remain alive a Year or two, yet they grow weaker, until they quite decay: so that whoever would cultivate them, should search them out in their Season of Flowering, and mark 'em; and when their Leaves are decay'd the Roots should be taken up, and planted in a Soil and Situation as nearly resembling that wherein they naturally grow, as possible, otherwise they will not thrive: So that they cannot be plac'd all in the same Bed; for some are only found upon chalky Hills, others in moist Meadows, and some in shady Woods, or under Trees: but if

if their Soil and Situation be adapted to their various Sorts, they will thrive and continue several Years, and, during their Season of Flowering, will afford as great Varieties as any Flowers which are at present cultivated.

The first Sort flowers in *April*, and is very common in Pastures and bushy Places in most Parts of *England*.

The second Sort flowers in *May*: This is common in Pastures almost every-where.

The third Sort is more rare than the former: This is found in a Lane near *Dartford* in *Kent*, and is one of the largest of all the Kinds: It flowers at the Latter-end of *May*.

The fourth Sort grows upon dry barren Hills, particularly between *Northfleet* and *Gravesend*: This flowers at the Latter-end of *April*.

The fifth Sort is found in great Plenty in *Westmorland*, but particularly in the Meadows, upon both the Banks of *Eden*, throughout several Parishes: It flowers in *May*.

The sixth Sort grows upon dry, barren, or chalky Hills in divers Parts of *England*: This flowers in *June*.

The seventh Sort grows upon chalky Hills, but is pretty rare; it is particularly found upon the Hills near *Cawsham* in *Berkshire*, and upon *Gogmagog* Hills in *Cambridgeshire*: It flowers in *May*.

The eighth Sort flowers in *August*: This grows upon dry stony Places, as also in moist Pastures in the North Parts of *England*.

The ninth Sort grows upon *Cawsham* Hills, as also upon the dry Banks on the Road-side between *Greenbith* and *Northfleet* in *Kent*; and flowers in *May*.

The tenth Sort is found about *Northfleet* with the former, and flowers about the same time, as doth also the eleventh and twelfth.

The thirteenth Sort flowers in *June*: This grows upon dry Places in many Parts of *England*, as doth the fourteenth Sort, which flowers in *April*.

The fifteenth and sixteenth Sorts grow in shady Places in divers Parts of *England*: They both flower in *May*.

The seventeenth and eighteenth Sorts grow in moist Pastures very plentifully; the first flowering in *May*, the other in *June*.

The nineteenth Sort grows in moist Pastures, and flowers in *June*.

The twentieth Sort grows in dry Pastures, and flowers in *May*.

Thus having mention'd the several Places of Growth, and the Times of these Plants Flowering, it will be no very difficult Task for a Person to search them out; which, if it happens to be in a Place where the Roots may be mark'd, and taken up after their Leaves are decay'd, (as I said before) there will be little Hazard of their succeeding: But if you are oblig'd to take 'em up in Flower, you must be very careful to preserve as much Earth as possible to their Roots, otherwise there can be little Hopes of their living. Nor should they be kept out of the Ground longer than till you can conveniently get them Home; for if the Air dries the

Earth about 'em, they will shrink, and be good for nothing; and if the Earth be water'd, the Roots of such as grow upon dry Soils will rot and perish; therefore you should be very careful in this Particular.

ORIGANUM, [of *ὄριγανον*, of *ὄρος* a Mountain, and *ἄριον* to rejoice, q. d. a Plant that delights to grow on Mountains.] Oragany, or Bastard Marjoram.

The Characters are;

It hath a labiated Flower, consisting of one Leaf, whose Upper Lip is erect, roundish, and divided into two; but the Under Lip is cut into three Segments: Out of the Flower-cup arises the Pointal, attended, as it were, by four Embryo's, which afterwards become so many roundish Seeds inclos'd in the Flower-cup: To which should be added, The Flowers grow in scaly Spikes, somewhat resembling those of the *Muscary*.

The Species are;

1. **ORIGANUM**; *vulgare, spontaneum*. J. B. Wild Marjoram.

2. **ORIGANUM**; *onites*. C. B. P. Pot Marjoram.

3. **ORIGANUM**; *Heracleoticum, cunila galinacea* Plinii. C. B. P. Winter Sweet Marjoram; *vulgó*.

4. **ORIGANUM**; *sylvestre, humile*. C. B. P. Dwarf Wild Oragany.

5. **ORIGANUM**; *sylvestre, foliis variegatis*. Hort. Ed. Wild Marjoram, with variegated Leaves.

6. **ORIGANUM**; *Oriente, folio brunella glauco, flore albo*. Vaill. Oriental Wild Marjoram, with a Self-heal Leaf, and white Flowers.

There are several other Species of this Plant preserv'd in curious Botanick Gardens, for Variety: but as they are never propagated for Use, so I shall not enumerate them in this Place.

The first Sort here mention'd grows wild upon dry chalky Hills, and on gravelly Soils, in divers Parts of *England*, and is gather'd by the People who supply the Markets with Medicinal Herbs; so that it is rarely cultivated in Gardens.

The second Sort was formerly more cultivated than at present: This was us'd as a Pot-herb for Soops, &c. but of late Years it has been almost neglected: It is said to grow wild in some Parts of *England*.

The third Sort has the Appearance of common Sweet Marjoram; and having a sweet Smell, is cultivated in many Gardens near *London*, and brought to the Markets to supply the Want of Sweet Marjoram early in the Season, before the Marjoram (which is an annual Plant) can be procur'd, and is us'd by the People who make up Nofegays.

The fourth and fifth Sorts are preserv'd as Varieties by some People, who use the fourth, many times, as a Pot-herb, instead of the second.

The sixth Sort was brought from the *Levant*, but is hardy enough to endure the severest Cold of our Climate in the open

open Air, provided it be planted upon a dry Soil.

These Plants may be all propagated by sowing their Seeds in the Manner directed for *Marjoram*, and the Plants should be treated in the same Way, therefore I shall forbear repeating it in this Place: They may also be propagated by parting their Roots, or planting Cuttings in the *Spring*, which, if water'd and shaded, will take Root in a few Days, and multiply exceedingly.

Their Roots will abide several Years, and require no farther Culture but to keep them clear from Weeds, and transplant them every Year, otherwise they will grow so large as to rot in the Middle for want of Air.

ORNITHOGALUM, [*ὄρνιθος γάλακτος*, of *ὄρνις* a Bird, and *γάλα* Milk, i. e. a Plant whose Flowers are as white as the white Plumes of feather'd Animals.] Star of Bethlehem.

The Characters are;

It hath a Lily Flower, compos'd of six Petals (or Leaves) ranged circularly, whose Centre is possess'd by the Pointal, which afterwards turns to a roundish Fruit, which is divided into three Cells, and fill'd with roundish Seeds: To which must be added, It hath a bulbous or tuberosc Root, in which it differs from Spiderwort.

The Species are;

1. **ORNITHOGALUM**; *angustifolium, majus, floribus ex albo virescentibus*. C. B. P. Spiked Star of Bethlehem, with a greenish Flower.

2. **ORNITHOGALUM**; *umbellatum medium, angustifolium*. C. B. P. Common Star of Bethlehem.

3. **ORNITHOGALUM**; *luteum*. C. B. P. Yellow Star of Bethlehem.

4. **ORNITHOGALUM**; *majus, spicatum, flore, albo*. C. B. P. The Great White Star of Bethlehem.

5. **ORNITHOGALUM**; *spicatum, flore viridilutescente*. C. B. P. Spiked Star of Bethlehem, with a whitish-green Flower.

6. **ORNITHOGALUM**; *luteum, five pallidum majus*. C. B. P. Great Yellow, or Pale Star of Bethlehem.

7. **ORNITHOGALUM**; *Neapolitanum*. J. B. Star of Naples; *vulgò*.

There are several other Species of this Plant mention'd by Botanick Writers; but those here enumerated are what I have observ'd in the *English Gardens*.

These Plants are propagated by Off-sets, which their Roots do commonly produce in great Plenty. The best Time to transplant their Roots is in *July*, when their Leaves are decay'd; for if they be remov'd late in *Autumn*, their Fibres will be shot out, when they will be very apt to suffer, if disturb'd. They should have a light sandy Soil; but it must not be over-dung'd, which would cause their Roots to decay. They may be intermix'd with other Bulbous-rooted Flowers in the Borders of the *Pleasure-Garden*, where they will afford an agreeable Variety, and continue in Flower a long Time. Their Roots need not be transplanted oftener than every other Year; for if

they be taken up every Year, they will not increase so fast; but when they are suffer'd to remain too long unremov'd, they will have so many Off-sets about them as to weaken their blowing Roots. These may also be propagated from Seeds, which should be sown and managed as most other Bulbous-rooted Flowers, and will produce their Flowers in three or four Years after sowing.

ORNITHOPODIUM, [of *ὄρνις* a Bird, and *πῶδος* a Foot, because the Husk of this Plant resembles the Foot of a small Bird.] Bird's-Foot.

The Characters are;

It hath a papilionaceous Flower, out of whose Empalement rises the Pointal, which afterwards becomes a hooked jointed Pod, for the most part waved, containing in each joint one roundish Seed: To which must be added, That several Pods grow together in such a manner as to resemble the Foot of a Bird.

The Species are;

1. **ORNITHOPODIUM**; *radice tuberculis nodosa*. C. B. P. Bird's-Foot, with a knobbed Root.

2. **ORNITHOPODIUM**; *majus*. C. B. P. The Greater Bird's-Foot.

3. **ORNITHOPODIUM**; *Scorpioides, siliqua compressa*. Tourn. Caterpillar Bird's-Foot, with a flat Pod.

4. **ORNITHOPODIUM**; *portulacæ folio*. Tourn. Bird's-Foot, with a Purslane Leaf.

These Plants are propagated by sowing their Seeds in the *Spring* upon a Bed of light fresh Earth, where they are to remain; (for they seldom do well when they are transplanted); and when the Plants come up, they must be carefully clear'd from Weeds; and where they are too close, some of the Plants should be pull'd out, so as to leave the remaining ones about ten Inches asunder. In *June* these Plants will flower, and the Seeds will ripen in *August*. There is no great Beauty in them; but, for the Variety of their jointed Pods, they are preserv'd by some curious Persons in their Pleasure-Gardens; where, if their Seeds be sown in Patches in the Borders, each Sort distinctly by itself, and the Plants thinn'd, leaving only two at each Patch, they will require no further Care; and will add to the Variety, especially where the *Snail* and *Caterpillar* Plants are preserv'd, which are very proper to intermix with them. They are all annual Plants, which perish soon after their Seeds are ripe.

OROBUS, [*ὄρος*, of *ἐφαγω* to eat, and *βους* an Ox, q. d. an Herb with which Oxen are fed, because the Antients us'd to fatten their Oxen with a like Herb.] Bitter Vetch.

The Characters are;

It hath a papilionaceous Flower, consisting of the Standard, the Keel, and the Wings; out of whose Empalement rises the Pointal wrapt up in the Membrane, which afterward becomes a round Pod, full of Oval-shap'd Seeds: To which must be added, That two Leaves join'd together grow upon a Rib that ends in a Point.

The

The Species are ;

1. OROBUS ; *sylvaticus, purpureus, vernus*. C. B. P. Vernal Purple-Wood Bitter-Vetch.
2. OROBUS ; *sylvaticus nostras*. Raii Syn. English Wood Bitter-Vetch.
3. OROBUS ; *sylvaticus, foliis oblongis glabris*. Tourn. Wood or Heath Peas.
4. OROBUS ; *sylvaticus, foliis viciæ*. C. B. P. Wood Orobus, with Vetch-Leaves.
5. OROBUS ; *latifolius, repens, siliquâ parvâ*. Boerb. Ind. Broad-leav'd Creeping Orobus, with a small Pod, commonly call'd, Venetian Vetch.

The first of these Plants was brought from Germany, where it grows in the Forests in great Plenty, as also about Geneva, but it is hardy enough to endure the Cold of our Climate in the open Air, provided it be planted in a dry Soil. This may be propagated either from Seeds or by parting the Roots in the Spring. If you sow the Seeds, you should observe to put them pretty early into the Ground before the dry Weather comes on, otherwise the Seeds will not come up : As you should also transplant the Roots just before they begin to shoot, or else their Flowers will be very weak. The Roots of this Plant will abide many Years, and spring up fresh every Year, and in April produces fine Spikes of purple Pea-bloom Flowers, which are succeeded by strait black Pods two Inches long, containing several roundish bitter Seeds.

The second and third Sorts grow wild in Woods and shady Places in divers Parts of England, where, during their Season of Flowering, they make a handsome Appearance ; and when transplanted under Hedges in a Garden, they will thrive extreamly well, and produce great Quantities of Flowers every Spring.

These were formerly recommended by Dr. Lister, to be sown for Fodder, as a great Improvement ; but I believe them not very proper for that Purpose, since they seldom thrive well when expos'd to the Sun, nor will they ever rise to any considerable Height, their Branches trailing upon the Ground, unless they are supported, so that in a wet Season they would be apt to rot.

The fourth Sort rises to be two or three Feet high, and hath strong upright Stalks ; upon which, in May, are produc'd great Quantities of purple Flowers, which are succeeded by long strait Pods, containing oblong bitter Seeds. The Root of this Plant will abide many Years ; the Stalks decaying in Winter, but do spring up again the succeeding Year : It delights in a dry fresh Soil, and deserves a Place in large Borders under the Shade of Trees, where it will thrive well, and make a handsome Appearance.

The fifth Sort was formerly preserv'd in the Green-house as a tender Plant, but will endure the Cold of our Climate very well, if planted in a dry Soil ; and those Roots which are planted in the full Ground, will produce much stronger Flowers than those preserv'd in Pots. This Plant flowers in April, but seldom produces good Seeds in this Country.

These Plants may all be propagated either from Seeds, or by parting of their Roots, in

the manner directed for the first Sort ; and if rightly dispos'd in the Borders of a Garden, do afford an agreeable Variety : And since they are hardy, requiring but little Culture, they deserve a Place in every good Garden.

ORYZA ; [*ὄρυζα* of *ὀρύσσω*, to dig, because the Earth must be dug before the Seeds are sown.] Rice.

The Characters are ;

It bath its Grains dispos'd into a Panicle, which are almost of an oval Figure, and are cover'd with a thick Husk, somewhat like Barley.

There is but one Species of this Plant ; viz.

ORYZA ; *Matth.* Rice.

This Grain is greatly cultivated in most of the Eastern Countries, where it is the chief Support of the Inhabitants ; and great Quantities of it are brought into England and other European Countries every Year, where it is in great Esteem for Puddings, &c. it being too tender to be produc'd in these Northern Countries, without the Assistance of artificial Heat : But from some Seeds which were formerly sent to South-Carolina, there have been great Quantities produc'd, and it is found to succeed equally as well there as in its native Country, which is a very great Improvement to our American Settlements.

This Plant grows upon moist Soils, where the Ground can be flow'd over with Water after it is come up ; so that whoever would cultivate it in England for Curiosity, should sow the Seeds upon a Hot-bed : And when the Plants are come up, they should be transplanted into Pots fill'd with rich light Earth, and plac'd in Pans of Water, which should be plung'd into a Hot-bed, and as the Water wastes, so it must, from Time to Time, be renew'd again : In July these Plants may be set abroad in a warm Situation, still preserving the Water in the Pans, otherwise they will not thrive ; and towards the latter End of August they will produce their Grain, which will ripen tolerably well, provided the Autumn proves favourable.

OSIER ; *vide* Salix.

OX-EYE ; *vide* Bupthalmum.

OXYACANTHA ; *vide* Berberis.

PADUS ; *vide* Cerasus.

PÆONIA ; [so call'd of *Pæon* the Physician, because he is said to have cured *Pluto*, being wounded by *Hercules*, with this Herb.] The Peony.

The Characters are ;

It hath a Flower compos'd of several Leaves, which are plac'd orbicularly, and expand in Form of a Rose ; out of whose Empalement rises the Pointal, which afterwards becomes a Fruit, in which several little Horns, bent downwards, are gather'd, as it were, into a little Head, cover'd with Down, opening lengthwise, containing many globular Seeds.

The Species are ;

1. PÆONIA ; folio nigricante, splendido, quæ Mas. C. B. P. The Male Peony.
2. PÆONIA ; Mas, major, flore incarnato. Hort. Eyst. The greater Male Peony, with a Fresh-colour'd Flower.
3. PÆONIA ; communis vel Fæmina. C. B. P. The Female Peony.
4. PÆONIA ; Fæmina, flore pleno rubro, majore. C. B. P. Female Peony, with a large, double, red Flower.
5. PÆONIA ; pleno flore rubro, minor. J. B. Peony, with a lesser, double, red Flower.
6. PÆONIA ; flore exalbido, pleno, major. C. B. P. Greater Peony, with a double, whitish Flower.
7. PÆONIA ; Lusitanica, flore simplici odorato. Portugal Peony, with a single sweet-scented Flower.

There are some other Varieties of these Plants, which are preserv'd in some of the curious Botanick Gardens abroad ; but those here mention'd are all the Sorts I have observ'd in the English Gardens.

The first of these Sorts is chiefly propagated for the Roots, which are us'd in Medicine ; for the Flowers being single, do not afford near so much Pleasure as those with double Flowers, nor will they abide near so long in Beauty.

The second Sort hath larger single Flowers than the first, but they are of a paler Colour : This is preserv'd by Persons who are curious in collecting the various Kinds of Flowers, but is not so much esteem'd as those which follow.

All the Sorts with double Flowers are preserv'd in curious Gardens for the Beauty of their Flowers ; which, when intermix'd with other large growing Plants in the Borders of large Gardens, do add to the Variety, and the Flowers are very ornamental in Basons or Flower-pots, when plac'd in Rooms.

They are all extremely hardy, and will grow in almost any Soil or Situation, which renders them more valuable, for they will thrive under the Shade of Trees ; and in such Places they will continue much longer in Beauty.

They are propagated by parting their Roots, which multiply very fast. The best Season for transplanting them, is towards the latter End of August, or the Beginning of September ; for if they are remov'd after their Roots have shot out new Fibres, they seldom flower strong the succeeding Summer.

In parting of these Roots, you should always observe to preserve a Bud upon the Crown of each Off-set, otherwise they will come to nothing ; nor should you divide the Roots too small, (especially if you have regard to their blowing the following Year) ; for when their

Off-sets are weak, they many times don't flower the succeeding Summer, or at least produce but one Flower upon each Root : But where you would multiply them in Quantities, you may divide them as small as you please, provided there be a Bud to each Off-set ; but then they should be planted in a Nursery-bed, for a Season or two, to get Strength, before they are plac'd in the Flower-Garden.

The single Sorts may be propagated from Seeds (which they generally produce in large Quantities, where the Flowers are permitted to remain) ; which should be sown in the Middle of August upon a Bed of light fresh Earth, covering them over about half an Inch thick with the same light Earth : The Spring following the Plants will come up ; when they should be carefully clear'd from Weeds, and in very dry Weather refresh'd with Water, which will greatly forward their Growth. In this Bed they should remain two Years before they are transplanted, observing in Autumn, when the Leaves are decay'd, to spread some fresh rich Earth over the Beds about an Inch thick, and constantly to keep them clear from Weeds.

When you transplant them, (which should be done in September) you must prepare some Beds of fresh light Earth, which should be dug and well cleans'd from the Roots of all noxious Weeds ; then plant the Roots therein six Inches asunder, and about three Inches deep. In these Beds they may remain until they flower ; after which they may be transplanted where you design they should grow. It is very probable there may be some Varieties obtain'd from the Seeds of these Plants, as is common in most other Flowers ; so that those which produce beautiful Flowers may be plac'd in the Flower-Garden, but such as continue single or ill-colour'd, may be planted in Beds to propagate for medicinal Use.

The Portugal Peony may also be propagated either by Seeds or parting of the Roots in the same Manner as the other Sorts, but should have a lighter Soil, and a warmer Situation. The Flowers of this kind are single, but do smell very sweet, which renders it worthy of a Place in every good Garden.

PALIURUS: Christ's Thorn.

The Characters are ;

It hath long sharp Spines ; the Flower consists of five Leaves, which expand in Form of a Rose ; out of the Flower-cup (which is divided into several Segments) rises the Pointal, which becomes a Fruit shap'd like a Bonnet, having a Shell almost globular, which is divided into three Cells, in each of which is contain'd one roundish Seed.

We have but one Species of this Plant ; viz.

PALIURUS; Dod. Christ's Thorn.

This is by many Persons suppos'd to be the Plant from which the Crown of Thorns which was put upon the Head of our Saviour, was compos'd : The Truth of which is supported by many Travellers of Credit, who affirm, That this is one of the most common Shrubs in the Country of Judea ; and from the Pliableness

Pliableness of its Branches, which may be easily wrought into any Figure, it may afford a Probability.

It may be propagated by laying down its tender Branches in the Spring of the Year; which if carefully supply'd with Water in dry Weather, will take Root in a Year's time, and may then be taken off from the old Plant, and transplanted where it is to remain.

The best Time for transplanting this Plant is in the Beginning of *April*, just before it begins to shoot, observing to lay some Mulch upon the Ground about their Roots to prevent 'em from drying, as also to refresh them now and then with a little Water until they have taken fresh Root, after which they will require but very little Care. They are very hardy, and will grow to be ten or twelve Feet high, if planted in a dry Soil, and a warm Situation. There is little Beauty in this Plant, but it is kept in Gardens as a Curiosity.

PALMA; The Palm-Tree.

The Characters are;

It hath a single unbranch'd Stalk; the Leaves are dispos'd in a circular Form on the Top, which when they wither, or fall off with Age, new ones always arise out of the Middle of the remaining ones; among which, certain Sheaths or plain Twigs break forth, opening from the Bottom to the Top, very full of Flowers and Clusters of Embryo's.

The Species are;

1. PALMA; *major*. C. B. P. The greater Palm or Date-tree.

2. PALMA; *minor*. C. B. P. The Dwarf Palm, with prickly Footstalks.

3. PALMA; *Brasiliensis, prunifera, folio plicatili seu flabelliformi, caudice squamato*. Raii Hist. The Palmetto-tree.

4. PALMA; *altissima, non spinosa, fructu pruniformi, minore, racemoso sparso*. Sloan. Cat. The Cabbage-tree.

5. PALMA; *foliorum pediculis spinosis, fructu pruniformi, luteo oleoso*. Sloan. Cat. The oily Palm-tree.

6. PALMA; *tota spinosa, major, fructu pruniformi*. Sloan. Cat. The great Macaw-tree.

7. PALMA; *humilis, Dactylifera, radice repentissima soboliferâ, folio flabelliformi, pedunculo vix spinoso*. Boerb. Ind. The Dwarf Palm, with scarcely any Prickles upon the Footstalks.

8. PALMA; *foliis longissimis, pendulis, absque ullo pedunculo ex caudice glabro enatis*. Boerb. Ind. The Dragon-tree.

9. PALMA; *Japonica, spinosis pediculis, polypodii folio*. Par. Bat. The Palm-tree from Japan, with prickly Footstalks, and a Leaf like Polypody.

There are several other Sort of Palms which grow in the East and West-Indies, but those here mention'd are all I have observ'd now growing in the English Gardens.

These Plants may be easily produc'd from the Seeds (provided they are fresh); which should be sown in Pots fill'd with light rich Earth, and plung'd into a Hot-bed of Tanners

Bark; which should be kept in a moderate Temper, and the Earth frequently refresh'd with Water.

When the Plants are come up, they should be each planted into a separate small Pot fill'd with the same light rich Earth, and plung'd into a Hot-bed again, observing to refresh 'em with Water, as also to let them have Air in Proportion to the Warmth of the Season, and the Bed in which they are plac'd: During the Summer-time they should remain in the same Hot-bed, but in *August* you should let them have a great Share of Air to harden them against the Approach of Winter; for if they are too much forc'd, they will be so tender as not to be preserv'd through the Winter without much Difficulty, especially if you have not the Conveniency of a Bark-Stove to keep them in.

The Beginning of *October*, you must remove the Plants into the Stove, placing them where they may have a great Share of Heat (these being somewhat tenderer, while young, than after they have acquir'd some Strength); tho' indeed, they may be sometimes preserv'd alive in a cooler Situation, yet their Progress would be so much retarded, as not to recover their Vigour the succeeding Summer: Nor is it worth the Trouble of raising these Plants from Seeds, where a Person has not the Conveniency of a good Stove to forward their Growth; for where this is wanting, they will not grow to any tolerable Size in eight or ten Years.

Whenever these Plants are remov'd, (which should be done once a Year) you must be very careful not to cut or injure their large Roots, which is very hurtful to them, but you should clear off all the small Fibres which are inclinable to Mouldiness; for if these are left on, they will, in time, decay, and hinder the fresh Fibres from coming out, which will greatly retard the Growth of the Plants.

The Soil in which these Plants should be plac'd, must be compos'd in the following Manner; viz. A third Part of light fresh Earth taken from a Pasture-ground; a third Part Sea-sand, and the other Part rotten Dung or Tanners Bark: These should be carefully mix'd, and laid in a Heap three or four Months at least before it is us'd, but should be often turn'd over, to prevent the Growth of Weeds, and to sweeten the Earth.

You should also observe to allow them Pots proportionable to the Sizes of the Plants; but you must never let them be too large, which is of worse Consequence than if they are too small. During the Summer-season, they should be frequently refresh'd with Water, but you must be careful not to give it in too great Quantities; and in Winter they must be now and then refresh'd, especially if they are plac'd in a warm Stove, otherwise they will require very little Water at that Season.

These Plants are most of them very slow Growers, even in their Native Countries, notwithstanding they do arrive to a great Magnitude; for it has been often observ'd by several of the old Inhabitants of those Countries, that the Plants of some of these Kinds, have not

advanc'd

advanc'd two Feet in Height in twenty Years ; so that when they are brought into these Countries, it can't be expected they should advance very fast, especially where there is not due Care taken to preserve them warm in Winter : But however slow of Growth these Plants are in their Native Countries, yet they may be with us greatly forwarded by placing the Pots into a Hot-bed of Tanners Bark ; which should be renew'd as often as is necessary, and the Plants always preserv'd therein both Winter and Summer, observing to shift them into larger Pots as they advance in Growth, as also to supply them with Water : In which Management I have had several of them come on very fast ; for I observe the Roots of these Plants are very apt to root into the Bark (if their Pots remain a considerable Time without shifting) where they meet with a gentle Warmth, and the Moisture arising from the Fermentation of the Bark, doth preserve their Fibres plump and vigorous.

The *Date Palm* is of very slow Growth with us, but is easily produc'd from Seeds, taken out of the Fruit, which are brought into *England* in great Plenty ; but there are very few of these Plants of any considerable Size at present in the *English* Gardens.

The *Dwarf Palm*, with prickly Footstalks, as also that with few Prickles, are of humble Growth in their Native Countries, seldom rising above four or five Feet high, but do extend their Roots very far, and increase thereby in the same Manner as the common Fern doth, so that the waste Ground which is not cultivated, is over-run with the Plants ; the Leaves of which the Inhabitants cut, and send into these Countries to make Flag-Brooms. These grow in *Spain*, *Portugal* and *Italy*, and are much harder than any of the other Sorts.

The *Palmetto-Tree* is brought from the *West-Indies*, where it grows to be a very large Tree ; the Leaves of which the Inhabitants thatch their Houses withal, for which Purpose they are very useful in those Countries : These Leaves, before they are expanded, are cut, and brought into *England* to make Womens plaited Hats, which were, a few Years since, greatly in Fashion ; and the Berries of these Trees were formerly much in Use in *England* for Buttons. These were some of the chief Commodities which the *Bermuda Islands* did afford for Manufactory, but, at present, they are both diffus'd in *England*.

The *Cabbage-Tree* is very common in the *Caribbee Islands*, where it grows to a prodigious Height ; *Ligon*, in his *History of Barbadoes*, says, There are some of these Trees above two hundred Feet high, and that it is commonly a hundred Years before they arrive at Maturity enough to produce Fruit : The Leaves of this Tree envelope each other so that those which are inclos'd, being depriv'd of the Air, are blanch'd, which is the Part the Inhabitants cut for Plait for Hats, &c. and the *Gemma* or young Shoots are pickled, and sent into *England* by the Name of *Cabbage* : But whenever this Part is cut out, the Trees are destroy'd,

nor do they rise again from the old Roots, so that there are very few Trees left remaining near Plantations, except for Ornament ; for their Stems being exceeding strait, and their Leaves being produc'd very regularly at Top, do afford a most beautiful Prospect ; for which Reason the Planters generally spare two or three of them near their Habitations.

The *Oily Palm* grows in great Plenty on the Coast of *Guiney*, as also on *Cape Verd Island*, where they grow as high as the Main-Mast of a Ship : But these Trees have been transplanted to *Jamaica* and *Barbadoes*, in both which Places they thrive very well. The Inhabitants make an Oil from the Pulp of the Fruit, and draw a Wine from the Body of the Trees, which inebriates ; and with the Rind of these Trees they make Mats to lie upon. This Sort will easily rise from Seeds, and if kept warm, will grow much faster than the *Date-Palm*.

The *Macaw-Tree* is very common in the *Caribbee Islands*, where the *Negroes* pierce the tender Fruit, from whence flows out a pleasant Liquor, which they are very fond of ; and the Body of the Tree affords a solid Timber, with which they make *Javelins*, *Arrows*, &c. and is by some suppos'd to be a sort of *Ebony*. This Tree grows very slow, and requires to be kept very warm in Winter.

The *Dragon Tree* is very common in the *Madera's* and the *Canary Islands*, where they grow to be large Trees ; from the Bodies of which it is suppos'd the Dragon's Blood doth flow. This Plant arises very easily from the Seeds, and when it has acquir'd some Strength, is pretty hardy.

The *Japan Palm-Tree* is, at present, very rare in *England*, being only in two or three curious Gardens : It will come up from Seeds, if they are fresh, but the Plants must be kept very warm, especially while young, otherwise they will not live through our Winters.

All the Sorts of *Palms* are worthy of being preserv'd by those who are curious in maintaining *Exotick* Plants, for the singular Structure of their Parts and Beauty of their Leaves, which make an agreeable Variety amongst other curious Plants.

PANICLE : A *Panicle* is a Stalk diffus'd into several Pedicles, or Footstalks, sustaining the Flowers or Fruits, as in *Oats*, &c.

PANSIES ; *vide* *Viola Tricolor*.

PAPAYER ; Poppy.

The Characters are ;

The Flower, for the most Part, consists of four Leaves, which are plac'd orbicularly, and expand in Form of a Rose, out of whose Flower-cup (which consists of two Leaves) rises the Pointal, which afterwards becomes a Fruit or Pod, which is oval or oblong, and adorn'd with a little Head ; under which, in some Species, is open'd a Series of Holes quite round, into the Cavity of the Fruit, which is defended lengthwise with various Leaves or Plates, to which a great Number of very small Seeds adhere.

The

The Species are;

1. PAPAVER; *bortense, semine albo sativum* Dioscoridis album Plinio. C. B. P. Garden Poppy, with white Seeds.
2. PAPAVER; *bortense, semine nigro, sylvestre* Dioscoridis, nigrum Plinio. C. B. P. Garden Poppy, with black Seeds.
3. PAPAVER; *flore pleno, rubrum*. Hort. Eyst. Double Red Poppy.
4. PAPAVER; *flore pleno, album*. C. B. P. Double White Poppy.
5. PAPAVER; *flore pleno, purpureo*. C. B. P. Double Purple Poppy.
6. PAPAVER; *pleno flore, nigrum*. C. B. P. Black Double-flower'd Poppy.
7. PAPAVER; *laciniatis floribus*. C. B. P. Poppy with jagged Flowers.
8. PAPAVER; *flore pleno laciniato, eleganter striato*. Hort. Ed. Double jagged Poppy, with beautiful strip'd Flowers.
9. PAPAVER; *Oriente, hirsutissimum, flore magno*. T. Cor. Very rough Oriental Poppy, with a large Flower.
10. PAPAVER; *erraticum, majus* quæ Dioscoridi, Plinio, Theophrasto. C. B. P. Red Poppy, or Corn Rose.
11. PAPAVER; *erraticum, majus, foliis floribus variegatis*. H. R. Par. Great Wild Poppy, whose Flower-leaves are variegated.
12. PAPAVER; *erraticum, flore pleno*. C. B. P. Double Wild Poppy, commonly called The Dwarf Poppy.
13. PAPAVER; *erraticum, flore pleno miniato*. H. R. Par. Wild Poppy, with a double Vermilion-colour'd Flower.
14. PAPAVER; *erraticum, flore pleno igneo*. H. R. Par. Wild Poppy, with a double fiery Flower.
15. PAPAVER; *erraticum, flore pleno igneo, marginibus candidis*. H. L. Wild Poppy, with a double fiery Flower, edg'd with white.
16. PAPAVER; *erraticum, flore pleno Phœnicio, unguibus albis*. H. R. Par. Wild Poppy, with a double purple Flower and white Bottom.
17. PAPAVER; *erraticum, minus*. C. B. P. Lesser Wild Poppy, or Dwarf Poppy.
18. PAPAVER; *luteum perenne, laciniato folio, Cambro-Britannicum*. Raii. Syn. Welsh, or Yellow Wild Bastard Poppy.

The first Sort is cultivated in Gardens for medicinal Use, and is by some suppos'd to be the Plant from whence the Opium is procured: Of this there are several Varieties, which chiefly differ in the Colour of their Flowers; but they are no more than seminal Variations, and therefore not worth enumerating in this Place.

The Black Poppy grows wild in divers Parts of England: The Seeds of this Kind are sold to feed Birds, by the Name of Maw Seed. Of this Sort there are a vast Number of Varieties some of which produce exceeding large Double Flowers of various Colours, and beautifully strip'd: but these are apt to vary from Seed; therefore you should never save the Seeds of any but such as are very double, and well-colour'd, from which you may always expect to have good Sorts produc'd.

The Oriental Poppy is an abiding Plant, which produces a large single Flower in May,

which makes a beautiful Appearance: This may be propagated from Seeds, or by parting their Roots; the best Time to transplant them is at the Beginning of March: This must have a light Soil, and a warm Situation.

The Red Poppy, or Corn Rose, is never propagated in Gardens, but is very common upon chalky dry Soils in almost every Part of England, where the Plants come up amongst the Corn, and are very troublesome: The Flowers of this Kind are brought into the Markets for Medicinal Use. There are many Varieties of this Plant with double Flowers, which are cultivated in the Flower Garden, but especially the Dwarf Sort, of which there are some with very double Flowers, which are beautifully edged with white; these are by many Persons sown for Edgings to the large Borders of the Pleasure-Garden; tho' I think them no ways proper for this, since their Flowers are but of a short Duration; and the Plants, when their Seeds are perfected, do immediately decay, so that they appear unsightly. Besides, where they grow very close, the Flowers are generally small: but if they are sown in Patches upon the Borders, and when the Plants come up, are thinned out, so as to leave but three or four in each Place, they will flower very well, and look very beautifully,

All the Sorts of Poppies should be sown in Autumn; (for when they are sown in the Spring, the Plants have not Time enough to get Strength before the hot Weather causes them to run up to flower; so that their Flowers are never so large or double as those sown in the Autumn). When the Plants come up, they should be carefully clear'd from Weeds, which is all the Culture they require, (except to pull them up where they are too thick); for they thrive better when they are suffer'd to remain where they were sown, than if they were transplanted: but you should observe to let them have Room in Proportion to the Growth of the Plants. This Sort first mention'd grows very large, and tall, therefore should be not closer than eight or ten Inches. But the Black Sort, may stand somewhat nearer; tho' this appears handsomer when the Plants stand single; therefore it is the better way to scatter the Seeds of those which have beautiful Flowers very thin over the Borders of the Flower-Garden: and when the Plants come up they may be pull'd out where they are not well situated, leaving here and there a Plant, as the other Flowers in the Borders will admit, where, at the Season of their Flowering, they will make a pretty Variety amongst the Flowers: but they are of short Duration; and having an ill Scent, they are less esteem'd of late Years, since the Plenty of other more valuable Flowers.

PAPAVER CORNICULATUM; vide Glaucium.

PAPAVER SPINOSUM; vide Argemone.

PAPAYA: Papaw Tree.

The Characters are;

It hath a simple Stalk: The Flowers are Male and Female in different Plants: The Male Flowers (which are barren) are tubulous, consisting of one Leaf, and expand in the Form of a Star: The Female Flowers consist of several Leaves, which expand in Form of a Rose, out of whose Flower-cup rises the Pointal, which afterwards becomes a fleshy Fruit, shaped like a Cucumber or Melon, containing many small, oblong, furrow'd Seeds.

The Species are;

1. **PAPAYA**; fructu *Melopeponis* effigie. Plum. The Female Papaw Tree, bearing a Fruit like the *Melopepo*.

2. **PAPAYA**; fructu maximo, *Peponis* effigie. Plum. The Female Papaw Tree, bearing a Fruit like the *Pumkin*.

3. **PAPAYA**; mas. Boerb. Ind. The Male Papaw Tree.

These Plants are very common in the *Caribbee* Islands, where they arise from Seeds, and will produce Fruit in eight or ten Months after.

The Fruit is cut before it is ripe, and afterwards sliced and soak'd in Water until the milky Juice be out, and then boil'd and eat as *Turnips*, or bak'd as *Apples*; and when ripe, it is eaten as *Melons* with Pepper and Sugar, by the Inhabitants of those Countries.

The Flowers of the Male Sort, as also the Fruit of the Female, are preserv'd and sent over as a Sweetmeat to *Europe*, and are said to be very cooling and cordial.

In *England* these Plants are preserv'd as Curiosities, by such as delight in Exoticks: They are easily rais'd from the Seeds, (which are generally brought from the *West-Indies* in Plenty every Year) which should be sown upon a Hot-bed in *February* or *March*; and when the Plants are come up, they should be planted each in a separate small Pot fill'd with rich light Earth, and plung'd into a moderate Hot-bed of *Tanners Bark*, observing to water and shade them until they have taken Root; after which, you should let 'em have Air in Proportion to the Warmth of the Season, by raising the Glasses with Bricks, &c. and you must often refresh them with Water.

When the Plants have grown so as to fill the Pots with their Roots, they must be shaken out of them, preserving the Earth as intire as possible to their Roots, and placed in larger Pots, which should be fill'd with the same light Earth, and plung'd again into the Hot-bed, observing to give them Air and Water as was before directed: And thus from Time to Time, as the Plants increase their Stature, you should shift them into larger Pots, which will cause them to be very strong; and if you keep 'em in the Hot-bed all the *Summer*, and give them due Attendance, they will rise to fix or seven Feet high before *Winter*.

In *October* they should be placed into a new Hot-bed in the *Bark Stove* with other tender Exotick Plants, where, during the *Winter*-season, they must be carefully look'd after, to water and cleanse them well from Vermin

and Filth; and the Stove should be kept nearly to the *Anana's* Heat, as mark'd on *Mr. Fowler's Thermometers*, in which they will thrive and retain their beautiful large Leaves all the *Winter*: And the Male Sort will often continue to produce fresh Flowers all that Season, provided you do not keep 'em too dry. The Second Year the Female Sort will flower, and, if duly attended, will perfect the Fruit the following *Spring*.

These Plants make a very beautiful Appearance (when grown large) amongst other curious Exoticks in the Stove, and deserve a Place in every good Collection of rare Plants.

PAPILIONACEOUS: A *Papilionaceous* (or *Pea-bloom*) Flower, is so call'd, because, in some measure, it resembles a Butterfly, with its Wings expanded: It always consists of these four Parts; the *Vexillum* or Standard, which is a large erect Segment or Petal; the *Alae* or two Wings, which compose the Sides; and the *Carina* or Keel, which is a concave Petal or Segment, resembling the lower-part of a Boat; this Keel is sometimes intire, and sometimes it consists of two Petals or Segments adhering pretty closely together: Of this Tribe are *Peas*, *Beans*, *Kidney-beans*, *Vetches*, and other leguminous Plants.

PAPPOSE PLANTS, are such as have their Seeds cover'd with a Down, which adheres to the upper-part of the Seed, and are of Use to spread them when ripe, by sustaining 'em in the Air, so that they may be convey'd to a great Distance: Of this kind are the *Sow-thistles*, *Hawkweeds*, *Dandelion*, *Starworts*, &c.

PARASITICAL PLANTS, are such as are produced out of the Trunk or Branches of other Plants, from whence they receive their Nourishment, and will not grow upon the Ground, as the *Mistletoe*, &c.

PARIETARIA, [so call'd of *Paries*, Lat. a Wall, because it grows on old Walls.] Pellitory.

The Characters are;

It hath an apetalous Flower, whose Flower-cup is divided into four Parts, which is sometimes Bell-shap'd, and at other times shap'd like a Funnel, with four Stamina (or Threads) surrounding the Pointal; which Pointal becomes, for the most part, an oblong Seed surrounded by the Flower-cup: To which may be added, The Flowers are produced from the Wings of the Leaves.

The Species are;

1. **PARIETARIA**; officinarum, & *Dioscoridos*. C. B. P. Pellitory of the Wall.

2. **PARIETARIA**; minor, *Ocymi folio*. C. B. P. Lesser Pellitory, with a Basil Leaf.

The first of these Plants is suppos'd to be the true Sort which is recommended by *Dioscoridis* for medicinal Use: This is the most common in *Germany*, and some other Countries; but is very different from that which grows wild in *England*, which is more like the

the second Sort, tho' I can't positively affirm it to be the very same.

These Plants grow wild upon old Walls and Buildings in great Plenty; but may be cultivated by sowing their Seeds in *Autumn* upon a dry gravelly, or stony Soil, where they will thrive much better than in a richer Soil, and are preferable for Use to those which grow in a moist rich Ground; for tho' in such Places they will often be very rank, yet they are not near so strongly scented.

PARSLEY; *vide* Apium.

PARSNIP; *vide* Pastinaca.

PARTERRE, is a level Division of Ground, which, for the most part, faces the South and best Front of an House, and is generally furnish'd with *Greens, Flowers, &c.*

There are several Sorts of *Parterres*, as *Bowling-green*, or *Plain, Parterres* of *Embroidery, &c.*

Plain Parterres are more beautiful in *England* than in any other Countries, by reason of the Excellency of our Turf, and that Decency and unaffected Simplicity that it affords to the Eye of the Spectator.

Others are cut into Shell and Scroll-work, with Sand-Alleys between them, which are the finest *Parterre* Works esteemed in *England*.

As to the general Proportion of *Parterres* an Oblong or Long Square is accounted the most proper Figure for a *Parterre*; because by the Rules of *Perspective*, or the natural Declension of the visual Rays in *Opticks*, a long Square sinks almost to a Square, and an exact Square appears much less than it really is; therefore a *Parterre* should not be less than twice as long as it is broad; twice and a half is accounted a very good Proportion, and it is very rare that three times is exceeded.

As to the Breadth of a *Parterre*, it is to take its Dimensions from the Breadth of the Front of the House: If it be not above an hundred Feet, 'twill be too narrow; and if the Front be two hundred Feet, the *Parterre* must be of the same Breadth.

Some do not approve of making *Parterres* very broad, because it makes 'em appear too short; when nothing is more pleasing to the Eye, than a contracted, regular Conduct and View, as soon as a Person goes out of an House or Building: And a forward, direct View is the best, whether it be either *Parterre* or *Lawn*, or any other open Space, either two, three, or four-fold to the Width: And for that Reason, those Designs may justly be disapprov'd by which the Nobleness of the View is marred at the immediate Entrance into the Garden, the Angle of Light being broken and confus'd.

The making of *Parterres* too large, causes a great Expence, and at the same time occasions a Diminution of Wood, which is consequently the most valuable Part of a Garden.

There should be a *Terrass Walk* on each Side the *Parterre*, for an Elevation proper for View; and therefore there should never be

the Flat of a *Parterre* between *Terrass Walk* and *Terrass Walk* above three hundred Feet; nor can it well be made less than an hundred and forty; and then the Length, at twice and a half the Breadth, would be three hundred and fifty Feet, which some account a handsome Proportion.

As to the Adorning and Furnishing these *Parterres*, whether it be *Plain*, or with *Embroidery*, that depends much upon the Form of them, and therefore must be left to the Judgment and Fancy of the Designer.

PASQUE FLOWER; *vide* Pulsatilla.

PASSION FLOWER; *vide* Granadilla.

PASTINACA, [of *Pastus*, Lat. *fed*, because it is a Plant whose Root is edible.] Parsnip.

The Characters are;

It is a Plant with rose and umbellated Flowers, consisting of many Petals or Leaves placed orbicularly, and resting on the Empalement, which turns, to a Fruit, compos'd of two Seeds, which are oval, large, thin, border'd, and generally casting off their Cover: To these Marks must be added, That the Leaves are winged and large.

The Species are;

1. PASTINACA; *fativa, latifolia*. C. B. P. Garden Parsnip.

2. PASTINACA; *sylvestris, latifolia*. C. B. P. Wild Parsnip.

3. PASTINACA; *sylvestris, altissima*. Tourn. The tallest Wild Parsnip, or Hercules's All-heal.

The first Sort grows wild in divers Parts of *England*, upon the Sides of dry Banks, and is by some affirm'd to be no ways different from the second Sort, but by Cultivation. Which is a very great Mistake; for I have sown the Seeds of both Sorts in the same Bed for several Years, but could not find that either Sort alter'd in the least, the first still retaining the same Smoothness in the Leaf, and the same pale Colour, and Largeness of Root; as did the second its usual Roughness, dark-green Colour, and slender Roots: Nor do I believe either Sort will alter, if they were cultivated ever-so long.

The Root and Seed of the first Sort is sometimes used in Medicine; but it is seldom cultivated in Gardens, the Markets being supply'd from the Fields: yet the Druggists do commonly sell the Seeds of the Garden Kind for it, which they may purchase at an easy Price, when it is too old to grow.

The second Sort is cultivated in Kitchen-Gardens, the Roots of which are large, sweet, and accounted very nourishing: They are propagated by Seeds, which should be sown in *February*, or *March*, in a rich mellow Soil, which must be well dug, that the Roots may run downward; their greatest Excellency being the Length and Bigness of the Roots: These may be sown alone, or with *Carrots* as is practis'd by the Kitchen-Gardeners near *London*, some of whom do also mix *Leeks*, *Onions*, and *Lettuce* with their *Parsnips*: But this

this I think very wrong; for it is not possible that so many different Sorts can thrive well together, except they are allowed a considerable Distance; and if so, it will be equally the same to sow the different Sorts separate. However, *Carrots* and *Parsnips* may be sown together very well, especially where the *Carrots* are design'd to be drawn off young; because the *Parsnips* do generally spread most towards the latter-end of Summer, which is after the *Carrots* are gone; so that there may be a double Crop upon the same Ground.

When the Plants are come up, you should hoe them out, leaving them about ten Inches or a Foot asunder; observing at the same time to cut up all the Weeds, which, if permitted to grow, would soon over-bear the Plants, and choak 'em: This must be repeated three or four times in the *Spring*, according as you find the Weeds grow: but in the latter-part of *Summer*, when the Plants are so strong as to cover the Ground, they will prevent the Growth of Weeds; so that after that Season they will require no farther Care.

When the Leaves begin to decay, the Roots may be dug up for Use, before which time they are seldom well-tasted; nor are they good for much late in the *Spring*, after they are shot out again: so that those who would preserve these Roots for *Spring* Use, should dig them up in the Beginning of *February*, and bury them in Sand, in a dry Place, where they will remain good until the middle of *April*, or later.

If you intend to save the Seeds of this Plant, you should make choice of some of the longest, straightest, and largest Roots, which should be planted about two Feet asunder, in some Place where they may be defended from the strong South and West Winds; for the Stems of these Plants do commonly grow to a great Height, and are very subject to be broken by strong Winds, if expos'd thereto: They should be constantly kept clear from Weeds; and if the Season should prove very dry, you must give them some Water twice a Week, which will cause 'em to produce a greater Quantity of Seeds; which will be much stronger than if they were wholly neglected. Toward the latter End of *August*, or the Beginning of *September*, the Seeds will be ripe, at which Time you should carefully cut off the Heads, and spread them upon a coarse Cloth for two or three Days to dry; after which, the Seeds should be beaten off, and put up for Use: But you must never trust to these Seeds after they are a Year old, for they will seldom grow beyond that Age.

The third Sort is preserv'd in Botanick Gardens, amongst some other Sorts of these Plants, for Variety, but is seldom propagated for Use: This is by many suppos'd to be the *Panaces Syriacum* of the Antients, from whence the *Opoponax* is taken, which is suppos'd to be the concrete Juice of this Plant: As is the *Asa fetida*, suppos'd to be the concrete Juice of one Species of this Plant.

All these Sorts may be cultivated by sowing their Seeds early in the *Spring*, or in *Autumn*

soon after they are ripe, and should be manag'd as the Garden Kind, with this Difference, viz. the Plants should not stand nearer than two Feet and an half Distance; but then they need not be reduced to this until the succeeding *Spring*: These Roots are perennial, and may be removed with Safety at any time after their Leaves are decay'd: They seldom produce Seeds until the third Year after they are sown.

PAVIA; The Scarlet Flowering Horse-Chestnut; vulgô.

The Characters are;

The Leaves are like those of the Horse-Chestnut: The Flower is of an anomalous Figure, and consists of five Leaves, which are so dispos'd as to resemble a Lip Flower; the two uppermost are united, and form a Sort of Helmet; the three undermost appear somewhat like a Mouth gaping: These Flowers are dispos'd into a Spike, and are of a beautiful scarlet Colour: The Ovary, which rises in the Centre of the Flower-cup, afterwards becomes an oblong pyramidal Fruit, divided into three Cells, in each of which is lodged one globular Seed.

There is but one Species, of this Tree, viz.

PAVIA. Boerb. Ind. The Scarlet Flowering Horse-Chestnut; vulgô.

This Tree is a Native of *America*, from whence the Seeds were first brought into *Europe*: It grows in great Plenty in the Woods of *South Carolina*, but is very hardy, enduring the severest Cold of our Climate in the open Air.

It may be propagated by sowing the Seeds in the *Spring*, upon a warm Border of light sandy Earth; and when the Plants come up, they should be carefully clear'd from Weeds: but they must not be transplanted until the *Spring* following, when they should be removed just before they begin to shoot, and placed either in a Nursery to be train'd up, or else into the Places where they are to remain; observing, if the Season be dry, to water 'em until they have taken Root, as also to lay some Mulch upon the Surface of the Ground, to prevent the Sun and Wind from drying it too fast: And as the Plants advance, so the lateral Branches should be pruned off, in order to reduce 'em to regular Stems.

You must also observe to dig the Ground about their Roots every *Spring*, that it may be loose, to admit the Fibres of the Roots, which, while young, are too tender to penetrate the Ground, if it be very hard.

With this Management the Plants will greatly advance, and in four or five Years will produce Flowers and Fruits, which in warm Seasons are perfected enough to grow, so that the Plants may be multiply'd therefrom very fast.

This Tree may also be propagated by budding or inarching it upon the common *Horse-Chestnut*: but the Trees thus rais'd will never arrive to near the Size of those which are produced.

duced from Seeds; nor will they grow near so fast.

Such of these Trees as are rais'd from Seeds, if planted in a good Soil, will grow to be twenty-five or thirty Feet high, and produce great Numbers of beautiful red Flowers, which commonly appear the Beginning of June; at which Season it makes a beautiful Appearance amongst other hardy Trees.

PEACH; *vide* Persica.

PEAR; *vide* Pyrus.

PEASE; *vide* Pisum.

PEASE EVERLASTING; *vide* Lathyrus.

PEDICLE, is that Part of a Stalk which immediately sustains the Leaf, a Flower, or a Fruit, and is commonly called a Footstalk.

PELLITORY OF THE WALL, *vide* Parietaria.

PENDULOUS HEADS OF FLOWERS are such as hang downward.

PENNATED. A Pennated Leaf (call'd in Latin, *Folium Pennatum*) is a compound Leaf divided into several Parts, (each of which is call'd a Lobe) plac'd along the middle Rib; either alternately or by Pairs. When the middle Rib is terminated by an odd Lobe, it is said to be unequally pennated; and equally pennated, when it is not terminated by an odd Lobe. When the Lobes are all nearly of the same Form and Bigness, it is call'd, an Uniform pennated Leaf; when they are not so, it is said to be Difform. Examples of pennated Leaves, are the Ash, Walnut, &c.

PENNY ROYAL; *vide* Pulegium.

PENTAPETALOUS FLOWERS, are such as have five Leaves.

PENTAPHYLLOIDES; [of *virtu* five, *quasi* a Leaf, and *an* Form. Bastard Cinquefoil.

The Characters are;

It hath pennated Leaves, consisting of several Lobes placed along the middle Rib, and terminated by an odd Lobe, in which it differs from the Cinquefoil; the Flower consists of five Leaves, which expand in Form of a Rose, and are succeeded by hemispherical Seed-Vessels, which contain many small Seeds.

The Species are;

1. PENTAPHYLLOIDES; *Argentina dicta*. Raii Syn. Wild Tansey or Silver-Weed.

2. PENTAPHYLLOIDES; *fruticosum*. Raii Syn. Shrub Cinquefoil.

The first of these Plants is very common in moist Meadows, and by the Sides of Ditches in divers Parts of England, and is rarely cultivated in Gardens, for the Branches of these Plants trail upon the Ground, and take Root at their Joints, so that in a short time, a few of these Plants would over-run a whole Garden. This Herb is used in Medicine; for which Purpose it is gather'd in the Fields, and brought to Market by such Persons who make it their Business to gather wild Plants.

The second Sort grows to be four or five Feet high, and may be train'd to a regular Head. This is a very proper Shrub to intermix with others of the same Growth, in small Wilderness Quarters, where it will make a pretty Diversity, and continues flowering a long time.

This is propagated either by Suckers or Layers, which may be obtain'd in great Plenty, for it generally produces a great Number of Shoots from the Bottom, which when they come out near the Ground, may be earthed up or laid down therein; and if they are water'd in dry Weather, will take Root in a short time: when they may be taken off, and transplanted where they are to remain. The best Time to transplant them is in October or February: They delight in a moist Soil, though they will grow in almost any Soil or Situation.

There are several other Species of this Plant, which are preserv'd in several curious Botanick Gardens for Variety; but as they are Plants of little Beauty or Use, so I shall not enumerate them here.

PEONY; *vide* Pæony.

PEPO; [takes its Name of *στεινός*, to ripen, because the Fruit of this Plant ripens very readily.] Pumpkin.

The Characters are;

The Flower consists of one Leaf, which is Bell-shaped, expanded at the Top, and cut into several Segments: Of these Flowers some are Male, and some are Female, as in the Cucumbers and Melons. The Female Flowers grow upon the Top of the Embryo, which afterwards becomes an oblong or round fleshy Fruit, having sometimes a hard, rugged, or uneven Rind, with Knobs and Furrows, and is often divided into three Parts, inclosing flat Seeds, that are edged or rimmed about as it were with a Ring, and fix'd to a spongy Placenta.

The Species are;

1. PEPO; *oblongus*. C.B.P. The greater oblong Pumpkin.

2. PEPO; *vulgaris*. Raii Hist. The common Pumpkin.

3. PEPO; *rotundus Aurantii formâ*. C.B.P. Orange-shap'd Pumpkin.

4. PEPO; *fructu parvo, pyriformi*. Tourn. Pear-shap'd Pumpkin.

5. PEPO; *fructu minimo, sphaerico*. Tourn. Pumpkin, with a very small spherical Fruit.

There are several other Varieties of these Fruits, which seem to be only seminal Variations, so that it would be needless to mention them all in this Place, since the Seeds taken from any one of the Sorts will not continue the same three Years together, if sown in the same Garden, as I have several times experienc'd.

The two first Sorts are by some Persons cultivated for their Fruit; which when ripe, they cut open, and take out the Seeds, and then slice some Apples into the Shell, mixing them with the Pulp of the Fruit and Sugar: This they bake in an Oven, and afterwards eat it spread upon Bread; but it is too strong for

Persons of weak Stomachs, and only proper for Country People who use much Exercise.

The Seeds of these Plants are us'd as one of the four cold Seeds in Medicine.

The other Sorts are preserv'd by some curious Persons for Variety, but are of little Use, being good for nothing when grown old; but while they are very small, some Persons gather and boil them, like Turnips, or as they do the Squashes, and are very fond of them.

These may be propagated in the same manner as was directed for the Gourds, to which I shall refer the Reader, to avoid Repetition.

PERENNIAL PLANTS, are such whose Roots will abide many Years, whether they retain their Leaves in Winter or not: Those which do retain their Leaves, are call'd *Evergreens*; but such as cast their Leaves, are call'd *Deciduous* or *Perdifo*ls.

PERICLYMENUM; [*περικλῦνον*, of *περὶ* about, and *κλῦν* to roll, because the Branches of these Plants roll or twist themselves round such Plants as grow near them.] Trumpet Honeyfuckle; *vulgô*.

The Characters are;

It hath the whole Appearance of the Honeyfuckle, (from which it differs in the Shape of the Flower) which is tubulose or Bell-shap'd, and expands at the Top, where it is cut into several almost equal Segments.

We have but one Species of this Plant at present, viz.

PERICLYMENUM, *Virginianum*, *sempervirens* & *florens*. H. L. Virginian Scarlet Honeyfuckle; *vulgô*.

This Shrub is greatly esteem'd for the Beauty of its Flowers, which are of a fine Scarlet-colour; the Leaves continue all the Year green, and it continues flowering most Part of the Summer.

It may be propagated by laying down the tender Branches in the Spring, observing in dry Weather to refresh them with Water, which will greatly facilitate their Rooting: The Spring following they will be fit to transplant; when they should be cut off from the old Plants, and carefully taken up, so as not to injure their Roots. The best Time to remove them is in March, just before they shoot out; but you must observe, if the Season should prove dry, to water them, and lay a little Mulch upon the Surface of the Ground near their Stems, to prevent the Ground from drying too fast. It should have a strong Soil, and be expos'd to the South-East Sun, but must have the Assistance of a Wall or Pale to support the Branches, otherwise they will trail upon the Ground.

This Plant, although a Native of Virginia, yet if planted in a clear Air, will endure the severest Cold of our Climate very well, but it will not thrive in close Places, or too near the City, the Smoak arising from the Sea-coal Fires being very pernicious to it.

PERIPLOCA; [*περιπλόα*, of *περὶ* about, and *πλόα* a knitting or plaiting, because this

Plant entangles it self with it self, or any other neighbouring Plants.] Virginian Silk; *vulgô*.

The Characters are;

The Flower consists of one Leaf, which is more expanded at the Brim than those of the Apocynum; the Pointal which rises in the Center of the Flower-cup, becomes a Fruit so nearly resembling that of the Apocynum, as not to be distinguish'd therefrom but by very curious Observers; to which should be added, it hath climbing Stalks.

The Species are;

1. **PERIPLOCA**; *foliis oblongis*. Tourn. *Periploca*, with oblong Leaves.

2. **PERIPLOCA**; *Monspeliaca*, *foliis rotundioribus*. Tourn. *Periploca* of Montpellier, with rounder Leaves.

There are several other Species of this Plant which are Natives of America; but the two here mentioned are all I have observ'd in the English Gardens: The first is very common in England, but the latter is, at present, pretty rare.

These may be propagated by laying down their Branches in the Spring, which will take Root in a Year's time; when they may be taken off, and transplanted where they are to remain: Which should be either against a lofty Wall or Building, or else plac'd in Wilderness Quarters amongst other tall Flower-trees, where they should be supported by strong Poles, about which these Plants will twine and rise to a great Height. These two Sorts are hardy, and will endure the Cold of our Winters very well, provided they are planted in a dry Soil.

They produce their Flowers in June and July, but do rarely perfect their Seeds in England. Their Flowers are not very beautiful, but, for their Oddness, may have a Place amongst other hardy Shrubs in every good Garden.

PERIWINKLE; *vide Pervinca*.

PERSICA: [so call'd of Persia in Asia, from whence this kind of Plant was brought into our Climate.] The Peach-Tree.

The Characters are;

It hath long narrow Leaves; the Flower consists of several Leaves, which are plac'd in a circular Order, and expand in Form of a Rose; the Pointal, which rises from the Center of the Flower-cup, becomes a roundish, fleshy Fruit, having a longitudinal Furrow, inclosing a rough, rugged Stone, which is deeply furrow'd, by which it is distinguish'd from the Almond.

There are a great Variety of these Trees, which are cultivated in the Gardens of those who are curious in collecting the several Sorts of Fruit in the different Parts of Europe: I shall therefore first beg Leave to mention two or three Sorts which are cultivated for the Beauty of their Flowers; after which, I shall enumerate the several Sorts of good Fruit which have come to my Knowledge:

1. **PERSICA**; *vulgaris*, *flore pleno*. Tourn. Peach-Tree, with double Flowers.

2. **PERSICA**;

2. PERSICA; *Africana, nana, flore incarnato, simplici*. Tourn. Dwarf-Almond, with single Flowers; *vulgô*.

3. PERSICA; *Africana, nana, flore incarnato, pleno*. Tourn. Double-flowering Dwarf-Almond; *vulgô*.

The first of these Trees is a very great Ornament in a Garden early in the Spring, the Flowers being very large, double, and of a beautiful Red or Purple-colour. This may be planted in Standards, and if intermix'd amongst other Flowering-trees of the same Growth, makes a very agreeable Variety: Or it may be planted against the Walls of the Pleasure-Garden, where the beautiful Appearance of its Flowers early in the Spring will be more acceptable in such Places than the choicest Fruits, which must be expos'd to Servants, and others, so that they seldom can be preserv'd in large Families until they are ripe. This Tree may be propagated by budding it on the *Almond* or *Plumb* Stocks, in the same manner as the other Sort of *Peaches*, and should be planted in a good fresh Soil that is not over moist.

The other two Sorts are of humbler Growth, seldom rising above five Feet high: These may be budded upon *Almond*-Stocks, or propagated by *Layers*; they will also take upon *Plum*-Stocks; but they are very apt to canker, after they have stood four or five Years upon those Stocks, especially that with double Flowers, which is tenderer than the other.

These Shrubs make a very agreeable Variety amongst low Flowering-trees, in small Wilderness Quarters. The single Sort flowers in the Beginning of *April*, and the double is commonly a Fortnight later.

I shall now proceed to mention the several Sorts of good *Peaches* which have come to my Knowledge; and though, perhaps, a greater Number of Sorts may be found in some Catalogues of Fruits, yet I doubt whether many of them are not the same Kinds call'd by different Names: For, in order to determine the various Sorts, it is necessary to observe the Shape and Size of the Flowers, as well as the different Parts of the Fruit; for this does sometimes determine the Kind, when the Fruit alone is not sufficient: Besides, there is a vast Difference in the Size and Flavour of the same *Peach*, when planted on different Soils and Aspects; so that 'tis almost impossible for a Person, who is very conversant with these Fruits, to distinguish them, when brought from various Gardens.

The present Confusion of the Names of Fruits hath been many times owing to the bringing over Trees from *France*; for the Persons who are generally employed to bring over those Trees for Sale, are intirely ignorant of their various Sorts, and do themselves take 'em upon Trust from the Persons, who make it their Business to propagate great Quantities to supply the Markets of *France*, whither they are brought in Waggon, and sold out in Parcels to those Persons who bring them into *England*. It also happens many times, that if they are receiv'd by right Names, that these,

in Length of Time, are lost, or the Trees come into the Possession of other Persons, who not knowing the true Name of the Fruit, do often give them new Names, whereby there is such a Confusion in the Names of Fruit, as is impossible to rectify: And hence some Persons have suppos'd a much greater Variety of *Peaches* than there is in reality; tho' as the greatest Part of these have been obtain'd from Seeds, so their Varieties may be multiply'd annually until there be no End of the Sorts. However, I shall content my self with enumerating the principal Sorts now known in *England*, which are sufficient for any Gentleman to make a Collection to continue through the whole Season of Fruit.

1. The *White Nutmeg* (call'd by the *French*, *Petite-Avant-Pesche*) is the first ripe *Peach*; Its Juice is musky, if well expos'd, and is ripe the Beginning of *July*: It is a great Bearer, and if planted in two different Aspects, the Fruit may be continu'd three Weeks in Perfection, otherwise 'tis soon gone after it is ripe, as is the Case with most other Summer Fruits. This should have a *South-East* and *South-West* Aspect.

2. The *Red Nutmeg* (or *La Pesche de Troy*) is ripe towards the End of *July*. This is a great Bearer, and if well expos'd, is an extraordinary good Fruit: It is somewhat larger than the *White*, and is of a beautiful red Colour towards the Sun.

3. The *Yellow Alberge* ripens soon after the *Red Nutmeg*, but is not esteem'd so good a Fruit: It is generally a good Bearer; the Flesh is yellow within; and for Variety, there may be one Tree planted where there is Room enough.

4. The *Red Magdalaine* (or *Magdalene Rouge*) is a middle-siz'd Fruit; the Flesh or Pulp is very delicious; it parts from the Stone where the Flesh is red, and the Tree is a good Bearer. This ripens the Beginning of *August*, and should have a *South* or *South-East* Aspect.

5. The *White Magdalaine* (or *Magdalene Blanche*) is a fine large Fruit, when planted in a good Soil; the Flesh is white, except near the Stone, where it is of a reddish Colour; it is very full of a rich viny Juice, and easily melts in the Mouth; it is a great Bearer, but is very subject to drop its Fruit, and is often invaded by Insects, as are many other Sorts of rich *Peaches*. This ripens the Beginning of *August*.

6. The *Mignonne* (or, as it is commonly call'd, *Minion*) *Peach*, is an excellent fine Fruit; the Side next the Sun is of a beautiful red Colour, as is also the Flesh next the Stone: the Pulp is very firm, and full of a rich Juice; it is a plentiful Bearer, and ripens the Beginning of *August*.

7. The *Italian Peach* (or *Pesche d'Italie*) is of an oval Shape somewhat pointed; the Flesh is very delicate, and full of Juice, and red towards the Stone, which is flat, and sharp pointed; it is a good Bearer, a hardy *Peach*, and ripens the Middle of *August*.

8. The *Early Newington* (or *Smith's Newington*) is a very good *Peach*; the Pulp is firm, of a rich sugary Flavour, and closely adheres

adheres to the Stone: This is very red on the Side next the Sun, as is also the Flesh near the Stone. This ripens the Beginning of *August*.

9. *Les Drufelles* (or *Drusel Peach*) is of an oval Shape; the Skin is of a soft purple Colour next the Sun; the Flesh is red, and dry, but of a very agreeable Flavour. This ripens the End of *August*.

10. The *Nobleſs* (or *Nobleſt*) is a fair large *Peach*; the Flesh comes clean from the Stone; the Pulp is melting, and full of a delicious Juice, and is of a reddish Colour, next the Stone: It is a good Bearer, and ripens the Beginning of *August*.

11. *La Chevreuſe* (or *Belle Chevreuſe*) is of a bright red Colour next the Sun; the Fruit is longish, and pretty large; the Pulp is full of a delicate sweet Juice, and ripens the latter End of *August*.

12. The *Chancellor* (or *Pefche Chanceliere*) was rais'd from the Stone of the *Chevreuſe Peach*, in the Gardens of the *Chancellor Seguire* in *France*, from whence it had its Name. It is a very large fair Fruit, full of a delicate sugary Juice, and is esteem'd amongst the best Sort of *Peaches* in *France*. It ripens the End of *August*.

13. The *Montauban* is a fair handſome *Peach*, of a deep red Colour on the Side next the Sun, but of a pale Green next the Wall; the Flesh is melting, and parts from the Stone, where it is of a faint red Colour. This is a very good Bearer, and ripens the Beginning of *August*.

14. The *Royal George Peach*. This is a middle-siz'd Fruit, pretty round, with a deep Furrow running lengthwise: It is of a dark red Colour on the Side next the Sun, and of a paler Colour next the Wall; the Skin is cover'd over with a downy Substance, and is full of red Spots; the Flesh is melting, of a delicate Flavour, and of a yellowish Cast; the Stone is large, and of a deep red Colour. This ripens the latter End of *August*.

12. The *Nivette Peach* is of a middling Size, of an oval or oblong Shape, a little compressed on the Sides, it is of a yellowish Colour, marbled with Red, and cover'd with a soft, downy Substance; the Flesh is soft, melting, of a yellow Colour, and parts from the Stone; the Juice is very rich: It ripens the Beginning of *September*.

16. The *Violet Peach* (or *Pefche Violette*) is somewhat long, of a middle Size; the Pulp is melting, and its Juice is of a vinous Flavour. This is by the *French* esteem'd the Queen of Fruits. It ripens towards the End of *August*, and is a plentiful Bearer.

17. The *Portugal Peach* is a fair, large, beautiful Fruit, of a deep red Colour towards the Sun, which fades off to a light Green next the Wall; the Skin has a soft Down upon it, and is pretty full of red Spots; the Flesh is very firm, of a rich vinous Flavour, and adheres closely to the Stone, which is small for the Size of the Fruit, but very rough. This ripens the Beginning of *September*.

18. The *Purple Alberge* (or *La Pefche Alberge Violette*) is a middle-siz'd Fruit, of a dark

Purple or Violet Colour on the Side next the Sun, which goes off to a dark Red next the Wall: The Flesh is yellow, and parts from the Stone, where it is red; it is full of a rich vinous Juice, and ripens towards the End of *August*.

19. The *Old Newington* is esteem'd one of the best *Peaches* in *England*; it is a large fair Fruit, of a lively red Colour next the Sun, which goes off to a yellowish Green next the Wall; the Flesh is firm, and closely adheres to the Stone; it is full of a delicious rich Juice, and of a deep Red next the Stone. This is accounted an indifferent Bearer, which is wholly owing to its Management in Pruning, for I have had it bear extremely well in a Standard, and the Fruit has been deeper Colour'd, and of richer Flavour than those against Wall.

20. *La Teton de Venus* (or *Venus's Breast*) is a middle-siz'd Fruit, rather long than round, having a very deep Sulcus, or Furrow, which divides it like a double Fruit; the two Sides of which rise somewhat like a Woman's Breast, from whence it had its Name; the Flesh is very white, with a little Blush of Red next the Sun; it is melting, and full of a high flavour'd Juice. This ripens the latter End of *August*.

21. *La Pefche Pourpre* (or *Purple Peach*) is a fair round Fruit, of a dark red Colour next the Sun, which goes off to a paler Red next the Wall: The Flesh next the Stone is very red; The Juice is of a most delicious Flavour when the Fruit is full ripe. This ripens the Beginning of *September*.

22. The *Pavy Royal* (or *Pefche Royale*) is a large round Fruit, of a dark red or black Colour next the Sun, which goes off to a paler Red next the Wall: The Flesh comes from the Stone, where it is very red; the Juice is exquisitely rich, and equal to, if not exceeding, all other *Peaches* yet known, provided it grows upon a Soil rather dry than moist, and is expos'd to a good Aspect. This ripens the Beginning of *September*.

23. The *Admirable* is a large round Fruit, of a fine red Colour next the Sun, which goes off to a greenish Yellow next the Wall; the Flesh is firm, and full of rich sugar'd Juice; it parts from the Stone, where it is of a deep red Colour. This is a great Bearer, and ripens toward the End of *August* or the Beginning of *September*.

24. *La Pavie rouge de Pomponne, ou Monſtreux* (or the *Monſtrous Pavy of Pomponne*) is the largest *Peach* yet known; it is of a globular Shape, deeply divided into two Parts; of a beautiful Red next the Sun, which goes off to a bright Yellow next the Wall; the Flesh is melting, and of a rich vinous Flavour. It ripens the Middle of *September*. This should have a *South-East* Aspect, and the Shoots should be laid very thin against the Walls, for if there are many Fruit upon a Tree, they seldom ripen, or are well-flavour'd.

25. The *Catherine Peach* is a fine large Fruit, (especially when not left too thick upon the Trees); the Skin is cover'd with a soft Down, and is of a dull red Colour next

next the Sun, which goes off to a whitish Green next the Wall; the Flesh is full of a rich vinous Juice, and, in a good Season, comes the nearest to the old *Newington Peach* of any other Sort. This is a great Bearer, but should be planted in a warm Soil, and to a *South-East Aspect*. It ripens in the Middle of *September*.

26. The *Rumbullion* is a middle-siz'd Fruit, rather round than long, deeply divided by a Sulcus or Furrow in the Middle, of a pleasant red Colour next the Sun, but of a light yellow next the Wall: The Flesh is of a bright Yellow, and parts from the Stone, where it is of a deep red Colour. The Juice is of a rich vinous Flavour; 'tis a good Bearer, and ripens the Middle of *September*.

27. The *Malacoton* (or *Cotton Apple*) is a large fair *Peach*; the Skin is cover'd over with a thick downy Substance, from whence it took its Name; it is of a beautiful red Colour next the Sun, but of a light Yellow next the Wall; the Flesh is firm, and full of a rich vinous Juice, and when duly ripen'd, is an excellent Fruit. This ripens towards the latter End of *September*. It should have a warm Soil, and the Branches must be laid very thin against the Wall, otherwise the Fruit seldom comes to any thing.

28. *La Sanguinelle* (or the *Bloody*) *Peach*, is a middle-siz'd Fruit, whose Flesh is of a deep red Colour within, from whence it had its Name; it parts from the Stone; the Outside next the Sun is of a deep Red, but the Side next the Wall is of a greenish yellow Colour. This ripens in *October*, so that unless the *Autumn* proves very favourable it is not good for any thing.

There are several other Sorts of *Peaches* which are very good in the South of *France* and other warm Countries, which with us do rarely ripen so as to be eatable, for which reason they are not worth cultivating; such are, the *Violette Tardive*, or *Late Violet*; *La Corbeil*, *La Pêche Noix*; the *Double-flower'd*, &c. which seldom ripen in *France* until the latter End of *October*, when the Nights are long, and frosty, the Season often very wet, and cold; so that these Fruits will be watery, insipid, and very unwholesome in this Country.

The *French* distinguish those we call *Peaches* into two Sorts, viz. *Pavies*, and *Peaches*; those are called *Peaches* which quit the Stone; and those whose Flesh closely adheres to the Stone, are call'd *Pavies*; These are much more esteem'd in *France* than the *Peaches*; though, in *England*, the latter are preferr'd to the former by many Persons.

The *French* do also distinguish them into *Male* and *Female*; the *Pavies* they make to be the *Male*, and the *Peaches* the *Female*: But this Division is without Foundation, since the Kernels of both Sorts will produce Trees equally; for the Flowers of *Peach-trees* are generally hermaphrodite, and have all the Parts of Generation in them, so that there is no Necessity of supposing any of them to be intirely *Male* or *Female*: But it is likely that this Distinction is of long standing, before

Persons had a perfect Notion of *Male* and *Female* in Plants, or at least they did not know how to distinguish them asunder.

The *Nectarines* (as I have in another Place said) are by the *French* call'd *Brugnons*, which differ from the other two Sorts, in having a firm, hard Flesh, and the Skins quite smooth, without any Down upon them. The Sorts of these I have already mention'd under the Article *Nectarines*, to which the Reader may readily turn, therefore I shall not repeat them in this Place.

I shall now set down the good Qualities of *Peaches*, by which any Person may judge of their Worth.

A good *Peach* ought to have a firm Flesh; the Skin should be thin, of a deep or bright red Colour next the Sun, and of a yellowish Cast next the Wall; the Flesh should be of a yellowish Colour, full of Juice, which should be high-flavour'd; the Stone small, and the Pulp or Flesh very thick. When a *Peach* hath all these Qualities, it may be esteem'd a valuable Fruit.

All the different Sorts of *Peaches* have been originally obtain'd from the Stones; which being planted, do produce new Varieties, as do the Seeds of all other Fruits: So that where Persons have Garden enough to allow Room for propagating these Fruits from Seeds, there is no Doubt but many good Sorts may be obtained, which will be better adapted to our Climate than such as are brought from warmer Countries; though it is true, that there will be many of them good for nothing, as the Case of most Fruits and Flowers which are produc'd from Seeds, amongst which there may be some valuable Kinds, superior to those from whence the Seeds were taken, yet there is always a great Number which are little worth: but if we can obtain but two or three valuable Sorts, it is sufficient to make Amends for the Trouble of raising them: But where Persons are so curious as to plant the Stones of these Fruits, great Regard should be had to the Sorts; and if the Fruit were permitted to remain upon the Trees until they dropp'd off the Kernels would be fitter for planting, and more likely to grow. The best Sorts for sowing are those whose Flesh is firm, and cleaves to the Stone; and from amongst these you should choose such as ripen pretty early, and have a rich vinous Juice; from which Sorts some good Fruit may be expected.

These Stones should be planted in *Autumn*, on a Bed of light dry Earth, about three Inches deep, and four Inches asunder; and in the Winter the Bed should be cover'd to protect them from the Frost, which if permitted to enter deep into the Ground will destroy 'em: In the Spring, when the Plants come up, they should be carefully clear'd from the Weeds, which should also be observ'd throughout the Summer; and if the Spring should prove very dry, if you refresh them now and then with a little Water, it will greatly promote their Growth: In this Bed they should remain until the following Spring; when they should be carefully taken up, so as not to break their

tender Roots, and transplanted into a Nursery, in Rows three Feet asunder, and eighteen Inches distant Plant from Plant in the Rows, observing to lay a little Mulch upon the Surface of the Ground about their Roots, to prevent its drying too fast: And if the *Spring* should prove very dry, you should give them a little Water once a Week, until they have taken Root; after which, they should be constantly kept clear from Weeds, and the Ground between the Rows carefully dug every *Spring*, to loosen it, so as that the tender Fibres may strike out on every Side.

In this Nursery they may remain two or three Years; after which, they should be transplanted, where they are to remain to produce Fruit.

In removing these Trees, you should observe to prune their downright Roots (if they have any) pretty short, and to cut off all bruised Parts of the Roots, as also all the small Fibres, which do generally dry, and when left upon the Roots, after planting again, grow mouldy, and decay; so that they are injurious to the new Fibres which are shot out from the Roots, and very often prevent the Growth of the Trees: But you should by no means prune their Heads; for the Plants which are produced from Stones, are generally of a more spongy Texture, and so more liable to decay when cut, than those which are budded upon other Stocks. Besides, as these Trees are design'd for Standards, (for it is not proper to plant them against Walls until you see the Produce of their Fruit, to shew which of them deserves to be cultivated); so they will never require any other pruning, but only to cut out decay'd Branches, or such as shoot out very irregular from the Sides; for more than this, is generally very injurious to them.

In planting these Trees, it will be the better way to dispose them singly in the Quarters of the Kitchen-Garden, where they will thrive and produce Fruit much better, than if they are planted pretty near each other in Rows; and as they are thus singly dispos'd, they will not do much Injury to the Crops which grow under them.

When they have produced Fruit, you will soon be a Judge of their Goodness: therefore such of them as you dislike may be destroy'd; but those which are good may be propagated by inoculating them upon other Stocks, which is the common Method now practis'd to propagate these Fruits: Therefore I shall now proceed to treat of that more particularly; in the doing of which, I shall set down the Method now commonly practis'd by the Nursery Gardeners; and then propose some few Things of my own, as an Improvement thereon, for such Persons who are very curious to have good Fruit. But first,

You should be provided with Stocks of the *Muscle* and *White Pear-Plums*, which are generally esteem'd the two best Sorts of *Plums* for Stocks to inoculate *Peaches* and *Nectarines* upon; as also some *Almond* and *Apricock* Stocks, for some tender Sorts of *Peaches* which

will not grow upon *Plum* Stocks: These should be all produced from the Stone, (as hath been already directed in the Article of a *Nursery*), and not from Suckers, for the Reasons there laid down.

When these Stocks have grown in the Nursery two Years, they will be strong enough to bud, the Season for which is commonly about *Midsummer*, when you should make choice of some good Cuttings of the Sorts of Fruit you intend to propagate, always observing to take them from healthy Trees, and such as do generally produce a good Quantity of well-tasted Fruit; for it is very certain, that any Sort of Fruit may be so far degenerated, where this Case is wanting, as not to be like the same Kind. Besides, whenever a Tree is unhealthy, the Buds taken from that Tree will always retain the Distemper, in a greater or less Degree, according as it hath imbib'd a greater or less Quantity of the distemper'd Juice. Thus, for Instance, where a *Peach* or *Nectarine* Tree hath been greatly blighted, so as that the Shoots have grown bussed, and the Leaves curled up to a great Degree, that Distemper is seldom recover'd again by the greatest Art, or at least not under several Years Management; for let the Seasons prove ever-so favourable, yet these Trees will continually shew the same Distemper: Which many Persons are so weak as to suppose a fresh Blight; whereas in reality it is no other but the Remains of the former Sickness, which are spread and intermix'd with all the Juices of the Tree; so that whatever Buds are taken from such Trees, will always retain a Part of the Distemper.

The Cuttings with which you are thus to be provided, should always be taken from the Trees either in a Morning or Evening, or else in a cloudy Day; for if they are cut off when the Sun is very hot, the Shoots will perspire so freely, as to leave the Buds destitute of Moisture, which is often the Cause of their miscarrying; and the sooner these are used when cut from the Trees, the better they will take. The Manner of this Operation being fully explain'd under the Article of *Inoculation*, I shall not repeat it in this place. The Management of these Trees during their remaining Time in the *Nursery*, is likewise fully set down under that Article: I shall therefore proceed to the Planting of these Trees, either against Walls, *Espaliers*, or for Standards. But as the future Success of these Trees doth in a great Measure depend upon the Soil in which they are planted; so I shall briefly set down the Method of Preparing the Earth for the Borders where they are design'd to grow.

The best Earth for *Peach* Trees, is such as is taken from a Pasture Ground, that is neither too stiff and moist, nor over-dry, but of a middling Nature; This should be dug from the Surface of the Ground about ten Inches deep, taking the Turf with it; and should be laid in Heaps eight or ten Months before it be used, during which Time it should be often turn'd, to rot the Turf, and break the

the Clods, whereby it will be render'd very light, and easy to work; and about the Beginning of *September* you should carry it into the Garden, and make the Borders, which must be rais'd in Height proportionable to the Moisture of the Garden; for if the Ground be very wet, it will be adviseable to lay some Rubbish in the Bottom of the Border, to drain off the Moisture, and to prevent the Roots of the Trees from running downwards; then raise the Border of Earth at least a Foot above the Level of the Ground, so that the Roots of the Trees may always remain dry: but if the Ground be pretty dry, the Borders should not be rais'd above four or five Inches higher than the Surface, which will be sufficient to allow for their sinking.

As to the Breadth of these Borders, that can't be too great; but they should never be less than six Feet broad where Fruit-Trees are planted; for when the Borders are made very narrow, the Roots of the Trees will be so confin'd in four or five Years Time, that they will seldom thrive well after. The Depth of these Borders should not be greater than two Feet; for where they are prepared to a great Depth, it only intices the Roots of the Trees downward, which may be the Cause of their future Barrenness; for their Roots being got down below the Influences of the Sun and Showers, do imbibe a great Quantity of crude Juices; which only add to the luxuriant Growth of the Trees, and destroy their Fruitfulness: besides, whatever Fruit are produced from such Trees, are not near so well-tasted, as are those which grow upon those Trees whose Roots lie near the Surface, and enjoy the kindly Benefit of the Sun's Heat, to correct and digest whatever Crudities there may be in the Earth.

Your Borders being thus prepar'd should lie about three Weeks or a Month to settle, by which time the Season for Planting will be come, which should be perform'd as soon as the Leaves begin to decay, that the Trees may take Root before the Frost comes on to prevent them: Then you should carefully take up the Trees out of the Nursery, so as not to break or bruise their Roots; and with a sharp Knife you must prune the extreme Parts of them, and cut off smooth any broken or bruised Roots; as also all the small Fibres should be taken off, for the Reasons before given.

And having thus prepar'd your Trees, you should measure out their Distance, which ought never to be less than fourteen Feet; but where the Ground is very good, they should be planted sixteen Feet asunder. This, I doubt not, will be thought too great a Distance by many Persons, especially since it is contrary to the general Practice at this Time: but I am satisfied, whoever shall try the Experiment, will find it no more than is sufficient for these Trees, where they are rightly managed; for if they do take kindly to the Soil, their Branches may be so train'd, as to furnish all the lower-part of the Wall in a few Years; which is what should be principally

regarded, and not, as is too often the Practice, run up the Shoots in Height; and leave all the lower Part of the Tree destitute of bearing Wood; so that, in a few Years, there will not be any Fruit but upon the upper Part of the Trees: which also must be the Case where they are planted too close; because there being no Room to extend the Branches on either Side, they are obliged to lead them Upright, which produces the before-mention'd ill Effect.

And here I can't help taking notice of another very great Error in planting Wall-Fruit; which is, the placing Standard, or Half-Standard Trees, between the others, to cover the upper Part of the Wall, and to produce Fruit, until the Trees underneath are grown up sufficient to furnish the Walls, when the Standards are to be taken away: This is done, without considering that the greater Number of Trees are planted in a small Compass, the less Nourishment they can receive, and so, consequently, must be the weaker; for the same Space of Ground can't nourish twenty Trees equally as well as it could ten: So that whatever Strength the Standard Trees may have, the Dwarfs will be proportionably weaker: And it is a common Observation, that most Trees extend their Roots as far under-ground, as their Branches spread above-ground; so that there should always be the same Allowance given to the Wall-Trees, if we would have them strong and vigorous; therefore the building very high Walls for Fruit is to no Purpose, for a ten or twelve Foot Wall will be sufficient for most Sorts of Fruit.

But to return to Planting: After you have mark'd out the Places where each Tree is to stand, you must with your Spade make a Hole wide enough to receive the Roots of the Tree; then you should place it down, observing to turn the Bud outwards, that the wounded Part of the Stock may be hid, and let the Stem of the Tree be placed about four or five Inches from the Wall, with its Head inclining thereto; then fill in the Earth with your Hands, observing to break the Clods, that the Earth may fall in between the Roots, so as no void Spaces may be left about them. You should also gently shake the Tree with your Hands, to settle the Earth down the better; then with your Foot gently press down the Earth about the Stem; but do not tread it down too hard, which is many times a very great Fault; for when the Ground is inclinable to bind, the treading of it close doth often render the Ground so hard, as that the tender Fibres of the Roots can't strike into it, whereby the Tree remains at a Stand for some Time; and if the Earth be not loosen'd in Time, it frequently dies; so that whenever you observe the Earth of your Borders to be bound, either by great Rains, or from any other Cause, you should dig and loosen it again, observing always to do it in dry Weather, if in *Winter* or *Spring*; but in *Summer* it should be done in a moist Season.

After

After you have thus planted your Trees, you should fasten their Heads to the Wall, to prevent their being shaken by the Wind, which would disturb their Roots, and break off the tender Fibres soon after they were produced, to the no small Prejudice of the Trees: You should also lay some Mulch upon the Surface of the Ground about their Roots, to prevent the Frost from penetrating the Ground, which would injure, if not destroy the small Fibres.

These Things being duly observed, they will require no farther Care 'till the *February* following; towards the latter end of which Month, or the beginning of *March*, according as the Season is earlier or later, you must cut off the Heads of the new-planted Trees, leaving only four or five Eyes above the Bud; in doing of which, you must be very careful not to disturb their Roots; to prevent which, you should place your Foot down close to the Stem of the Tree, and take fast hold of that Part of the Stock below the Bud with one Hand, to hold it steady, while with the other Hand you gently slope off the Head of the Tree with a sharp Knife at the intended Place, which should always be just above an Eye: This should always be done in dry Weather; for if there shou'd be much Rain soon after it is done, the Wet will enter the wounded Part, and damage the Tree: Nor should it be done in frosty Weather, for the same Reason; for that would enter the wounded Part, and prevent its healing over. After you have headed the Trees, you should gently loosen the Earth of the Borders, to admit the Fibres of the Roots: but you must be very careful, in doing of this, not to cut or bruise their new Roots, which would also damage them: And if the Mulch which was laid about their Roots in *Autumn*, be rotted, you may dig it into the Border at some Distance from the Roots of the Trees; and when the dry Weather comes on, you should pare off some Turf from a Pasture Ground, which should be laid upon the Surface of the Border about the Roots of the Trees, turning the Grass downwards, which will preserve a gentle Moisture in the Earth better than any other Sort of Mulch; and this will not harbour Insects, as do most Sorts of Dung and Litter, to the no small Detriment of the Trees.

In watering of these Trees, you should observe to do it with a Nessel upon the Watering-Pot, so as to let it out in Drops; for when it is hastily poured down, it causes the Ground to bind; and if you water over the Head of the Tree, it will be of great Service to it: Your Waterings should not be repeated too often, nor should it be given them in great Quantity, both which are very injurious to new-planted Trees.

In the Middle of *May*, when these Trees will have several Shoots six or eight Inches in Length, you should nail them to the Wall, observing to train them horizontally, rubbing off all fore-right Shoots, or such as are weak, whereby those which are preserv'd will be much stronger: But if there are not more than

two Shoots produced, and those very strong, you should at the same time nip off their Tops, which will cause each of 'em to push out two or more Shoots, whereby the Wall will be better supply'd with Branches: You must also continue to refresh them with Water in dry Weather, during the whole Season, otherwise they will be apt to suffer; for their Roots having but little hold of the Ground the first Year after Transplanting, if the Season should prove very dry, 'twill greatly retard their Growth, if due Care be not taken to water them.

In the Beginning of *October*, when you observe the Trees have done shooting, you should prune them; in doing of which you must shorten the Branches in proportion to the Strength of the Tree, which, if strong, may be left eight Inches long; but if weak, should be shorten'd to four or five: Then you should train them horizontally to the Wall, (as was before directed); so that the Middle of the Trees may be void of Branches; for that Part of the Tree will be easily furnish'd with Wood afterwards: whereas, if the Shoots are train'd perpendicularly to the Wall, those which are the strongest will draw the greatest Share of the Sap, from the Roots, and mount upwards; so that the Side-Branches will be deprived of their Nourishment, and grow weaker, until they many times decay; and this is the Reason that we see so many *Peach-Trees* with one upright Stem in the Middle, and the two Sides wholly unfurnish'd with Branches, whereby the Middle of each Tree cannot produce any Fruit, that being fill'd with large Wood, which never produces any Bearing Shoots: Nor can the two Sides of the Trees be regularly fill'd with fruitful Branches, when this Defect happens to them; therefore this Method should be carefully observ'd in the training up young Trees; for when they are permitted to run into Disorder at first, it will be impossible to reduce them into a regular healthful State afterwards, the Wood of these Trees being too soft and pithy to admit of being cut down again, (as may be practis'd on many other hardy Fruit-Trees, which will shoot out vigorously again); whereas these will gum at the Places where they are wounded, and in a few Years intirely decay.

The Summer following, when the Trees begin to shoot, you should carefully look over them, to rub off all fore-right Buds, or such as are ill plac'd, and train those which are design'd to remain horizontally to the Wall, in their due Order as they are produced; for this is the principal Season when you can best order the Trees as you would have them; whereas if they are neglected until *Midsummer*, as is the common Practice, a great part of the Nourishment will be exhausted by fore-right Shoots, and other useless Branches, which must afterwards be cut off; and hereby the remaining Shoots will be render'd very weak, and perhaps some part of the Wall be intirely unfurnish'd with Branches; which might have been easily supply'd in the Beginning

ning of *May*, by stopping some of the stronger Shoots, in such Parts of the Tree where there is a Necessity for more Branches, which would cause each of them to shoot out two or more Side-branches below the Ends of the Shoots, which may be guided into the vacant Parts of the Tree, as they are produced, so as that every Part may be regularly furnish'd with proper Wood, which is the greatest Beauty and Excellency of Wall-Trees: But you should always forbear stopping the Shoots in *Summer*, where there is not a Necessity for Branches to fill the Wall; for there cannot be a greater Fault committed, than that of multiplying the Number of Shoots, so as to cause a Confusion, whereby the Branches will be too weak to produce good Fruit: Besides, when they are too closely laid in upon the Wall, the Air is excluded from the Shoots by the great Number of Leaves, so that they are never duly ripen'd, and, consequently, what Fruit is produced thereon can't be so well-tasted as those which are produced upon such Trees where the Shoots receive all the Advantages of Sun and Air to mature them.

I thus having set down the Method of Training up young Trees, I shall now proceed to their Pruning, and future Management; which being the same as with full-grown Trees, will serve for general Directions how to manage these Sorts of Fruit.

In the Pruning of *Peach* and *Nectarine* Trees, (which require the same Culture), the two following Rules should be strictly observ'd; *viz.* 1st, That every Part of the Tree be equally furnish'd with Bearing-Wood; and, 2^{dly}, That the Branches are not laid in too close to each other, for the Reasons before laid down, with some others which will be hereafter inserted). As to the first, it must be observ'd, that all these Trees do produce their Fruit upon the young Wood, either of the preceding Year, or at most the two Years Shoots, after which Age they do not bear: Therefore the Branches should be pruned so as to cause them to produce new Shoots annually in every Part of the Tree; which cannot be done in the ordinary Method of Pruning, where Persons neglect their Trees at the Season when they are most capable of Management, which is in *May*, at which Time the luxuriant Growth of Branches may be check'd by pinching, and new Shoots produced where they are wanting, by stopping the neighbouring Branches; which Shoots being produced at that Season, will have Time enough to ripen and gain Strength before the *Autumn* comes on; whereas all those Shoots which are produced after the Beginning of *June*, will be crude and pithy; and tho' they may sometimes produce a few Blossoms, yet those do rarely bring Fruit; nor are the future Branches good which are produced from such Wood, the Vessels being too large to strain the Juices, so that they easily admit of great Quantities of crude Nourishment to pass through them. Therefore those Persons who only regard their Wall Trees at two different Seasons, *viz.* the *Winter* and *Mid-*

summer Pruning, can't possibly have them in good Order; for when all the Branches which were produced in the *Spring* are permitted to remain until the Middle or Latter-end of *June*, (as is the common Practice), some of the most vigorous will draw the greatest Part of the Nourishment from the weaker Branches, which, when the strong ones are taken off, will be too weak to produce fair Fruit; and hereby the Strength of the Trees is exhausted to nourish the useless Branches, which are annually cut off again: And thus are too many Trees managed, and at the same time Complaints made of their Luxuriancy; because two or three Shoots, by drawing in the greatest Share of the Nourishment, grow very strong and woody: (whereas, if the Nourishment had been equally distributed to a regular Quantity of Branches, there would be no Sign of their too great Strength), until, by often cutting off these vigorous Branches, the Trees are either entirely destroy'd, or at least render'd so weak as not to be able to produce Fruit: For altho' by thus weakening the Branches, it is often the Means to produce a good Number of Blossoms, (as may many times be observed also upon autumnal Shoots), yet the utmost of their Strength is spent in expanding the Flowers, so that they rarely produce Fruit, and very often the greatest Part of the Branches die soon after, which is suppos'd to be occasion'd by a Blight, (as I have elsewhere said) when in reality it is nothing less than the Fault of those who have the Management of the Trees. It is therefore of the greatest Consequence to Wall-Trees, especially of these Sorts, to go over them two or three times in the Month of *May*, to rub off all irregular Shoots, and to train in the Branches that are left in due Order to the Wall, that each Shoot may have an equal Advantage of Sun and Air, both of which are absolutely necessary to ripen and prepare the Wood for the next Year's Bearing.

And by duly observing the Trees at this Season, there will not be Occasion for so much Cutting, as is often practis'd on *Peach-Trees*, to their great Injury; for their wood Branches are generally soft, tender, and pithy, which, when greatly wounded, are not healed over again so soon as many other Sorts of Trees; and the Wet insinuating into the wounded Parts, doth often cause the Branches to canker and die; which may be entirely avoided, by the gentle, easy Method of Pinching and Rubbing off the Buds in the *Spring*-season, which never makes any Wounds on the Tree; and hereby a vast deal of Labour is saved; for one Person who is ready at this Business will go over a great Quantity of Walling in a Day; whereas if the Trees are permitted to grow rude all the *Spring*, they will require six times the Labour to reduce 'em into Order. Besides, it is a great Disadvantage to the Fruit, in permitting the Branches of the Trees to extend from the Wall, and shade 'em; and when they have grown under the Shelter of these Branches and Leaves all the *Spring*; until *Midsummer*, then by pruning off

some of these Shoots, and nailing the others close to the Wall, the Fruits are suddenly expos'd to the Sun and Air, whereby they receive a very great Check, and are not only retarded in their Growth, but often render'd ill-tasted, and have tough Skins.

The Distance which the Branches of these Trees should be allow'd against the Wall must be proportion'd to the Size of the Fruit, or the Length of the Leaves: For if we observe how the Branches of Trees are naturally dispos'd to grow, we shall always find them plac'd at a greater or less Distance, as their Leaves are larger or smaller, (as I have already observ'd under the Article of *Leaves*): And there is no surer Guide to a curious Artist, than Nature, from whence a Gardener should always be directed in every Part of his Profession; since his Business is to aid and assist Nature, where she is not capable of bringing her Productions to Maturity, or where there is Room to make considerable Improvements by Art; which cannot be any otherwise effected, than by gently assisting her in her own Way.

But to return to Pruning of these Trees: The Branches being carefully train'd in, as before directed in the *Spring* and *Summer* Seasons; we come now to treat of the *Winter* Pruning, which is commonly perform'd in *February* or *March*: but the best Season for this Work is about *Michaelmas*, when their Leaves begin to fall, which will be early enough for their Wounds to heal before the Frost comes on, so that there will be no Danger of their being hurt thereby: And the Branches of the Trees being proportion'd to the Strength of the Roots at that Season, all the ascending Sap in the *Spring* will be employ'd to nourish only those useful Parts of the Branches which are left: whereas if they are left unprun'd 'till *February*, the Sap in the Branches being then in Motion, as may be observ'd by the swelling of the Buds, the greatest Part of it will be drawn up to the extreme Parts of the Branches, to nourish such Blossoms as must be afterwards cut off: And this may be easily known, by observing the strongest Shoots at that Season, when you will find the extreme Buds to swell faster than most of the lower ones; for there being no Leaves then upon the Branches to detain the Sap to nourish the lower Buds, the upper ones will always draw from those below.

But it is a constant Practice amongst Gardeners, founded upon long Experience, to prune weak Trees early in the *Winter*, and luxuriant Trees late in the *Spring*, in order to check their Luxuriancy. Now it is evident, that this Check does not proceed from any considerable Loss of Sap at the Wounds of the pruned Tree, (excepting a few of the bleeding Trees, when cut at that Season), but must arise from some other Cause; for by several Experiments made by the Reverend Mr. *Hales*, in fixing Mercurial Gages to the Stems of fresh cut Trees, he found those Wounds were constantly in an imbibing State, except the Vine in the bleeding Season.

When a weak Tree is pruned early in the Beginning of *Winter*, the Orifices of the Sap-vessels are clos'd up long before the *Spring*; and consequently, when in the *Spring* and *Summer*, the warm Weather advancing, the attracting Force of the perspiring Leaves is not then weakened by many Inlets from fresh Wounds, but is wholly exerted in drawing Sap from the Root: whereas, on the other hand, when a luxuriant Tree is pruned late in the *Spring*, the Force of its Leaves to attract Sap from the Root will be much spent and lost at the several fresh cut Inlets.

Besides, if it were no Advantage to the Trees to prune them at this Season, (which, I think, no one will have Reason to doubt, after making the Trial), but that it only succeeds as well as the *Spring* Pruning; yet there is a great Advantage in doing of it at *Michaelmas*; for that being a much more leisure Season with Gardeners than the *Spring*, they will have more Time to perform it carefully; and then they will not have too many Things come together, which may require to be immediately executed: for the *Spring* being the principal Season for Cropping their Kitchen-Garden, and attending their Hot-beds, if they are disengaged from the Business of Pruning at that Time, it will be of great Advantage, especially where there is a great Quantity of Walling. And here is also another Benefit in Pruning at this Season, which is, the having the Borders at liberty to dig and make clean before the *Spring*, so that the Garden may not appear in Litter at that Season.

Having said thus much concerning the Time of Pruning, I shall now proceed to give some general Directions how it is to be perform'd on *Peach* and *Nectarine* Trees, which require a very different Management from most other Sorts of Fruits.

In Pruning of these Trees, you should always observe to cut them behind a Wood-bud, (which may be easily distinguish'd from the Blossom-buds, that are shorter, rounder, and more turgid than the Wood-buds); for if the Shoot have not a leading Bud where it is cut, it is very apt to die down to the next leading Bud; so that what Fruit may be produced above that, will come to nothing, there being always a Necessity of a leading Bud to attract the Nourishment; for it is not sufficient that they have a Leaf-bud, as some have imagined, since that will attract but a small Quantity of Nourishment; the great Use of the Leaves being to perspire away such crude Juices as are unfit to enter the Fruit: The Length you should leave these Branches should be proportion'd to the Strength of the Tree, which, in a healthy strong Tree may be left ten Inches or more; but in a weak one, they should not be more than six Inches: however, in this you must be guided by the Position of a leading Bud; for it is better to leave a Shoot three or four Inches longer, or to cut it two or three Inches shorter, than we would chuse to do, provided there be one of these Buds, it being absolutely necessary, for the

the future Welfare of the Tree: You should also cut out entirely all weak Shoots, tho' they may have many Blossom-buds upon them; for these have not Strength enough to nourish the Fruit, so as to give it a kindly Flavour, but they will weaken the other Parts of the Tree.

In nailing the Shoots to the Wall, you must be careful to place them at as equal Distances as possible, that their Leaves, when come out, may have Room to grow, without shading the Branches too much; and you should never nail them upright, if it can be prevented; for when they are thus train'd, they are very subject to shoot from the uppermost Eyes, and the lower part of the Shoots will thereby become naked.

There is not any Thing in the Business of Gardening, which has more exercis'd the Thoughts of the Curious, than how to preserve their tender Sorts of Fruit from being blighted in the *Spring* of the Year; and yet there has been little wrote upon this Subject which is worth Notice: Some have propos'd Mattresses of Straw or Reeds to be placed before the Fruit-Trees against Walls, to prevent their being blighted: Others have directed the fixing horizontal Shelters in their Walls, to prevent the perpendicular Dew or Rain from falling upon the Blossoms of the Fruit-Trees, which they suppos'd to be the chief Cause of their Blighting: But both these Contrivances have been far from answering the Expectations of those Persons who have put them in Practice, (as I have elsewhere shewn); therefore it may not be improper to repeat some Things in this Place, which I have before mention'd, in relation to this Matter. And,

1st, I have already said, That the Blights, which are so often complain'd of, do not proceed from any external Cause or Inclemency in the Season, so often, as from a Distemper or Weakness in the Trees: For if we observe the Trees at that Season, where they are the most subject to what is call'd a Blight, we shall find the Branches very small, weak, and not half ripen'd, as also train'd in very close to each other; these Branches are, for the most part, full of Blossom-buds, (which is chiefly occasion'd by their want of Strength). These Buds do indeed open, and, to Persons not skill'd in Fruit-Trees, shew a great Prospect of a plentiful Crop of Fruit; whereas the whole Strength of the Branches is spent in nourishing the Flowers, and being unable to do any more, the Blossoms fall off, and the small Efforts of the Leaf-buds are check'd, so that, many times, the greatest Part of the Branches die away; and this is call'd a great Blight: whereas at the same time it may be often observ'd, that some Trees of a different Sort, nay, ev'n some of the same Sort which were stronger, tho' placed in the same Soil, expos'd to the same Aspect, and subject to the same Inclemency of Air, have escap'd very well, when the weak Trees have appear'd to be almost dead; which is a plain Indication that it proceeds from some Cause within the Tree, and not from any external Blight. All this will there-

fore be remedy'd, by observing the foregoing Directions in the Pruning and Management of the Trees, so as never to over-burden them with Branches, nor to suffer any Part of the Trees to exhaust the whole Nourishment from the Root, so as to cause the other Parts to be very weak; but to distribute the Nourishment equally to every Shoot, so that there may be none too vigorous, at the same time that others are too weak; and by continually rubbing off useless or fore-right Shoots, as they are produced, the Strength of the Trees will not be spent to nourish such Branches as must be afterwards cut out, which is too often seen in the Management of these Trees. And,

2^{dly}, It sometimes happens, that the Roots of these Trees are buried too deep in the Ground, which, in a cold or moist Soil, is one of the greatest Disadvantages that can attend these tender Fruits; for the Sap which is contain'd in the Branches, being by the Warmth of the Sun, put strongly into Motion early in the *Spring*, is exhausted in nourishing the Blossoms, and a Part of it is perspired through the Wood-branches, so that its Strength is lost before the Warmth can reach to their Roots, to put them into an equal Motion in search of fresh Nourishment, to supply the Expence of the Branches, for want of which, the Blossoms fall off and decay, and the Shoots seem to be at a Stand, until the farther Advance of the Warmth penetrates to the Roots, and sets them in Motion; when suddenly after, the Trees, which before look'd weak and decaying, do make prodigious Progress in their Shoots; and before the *Summer* is spent, are furnish'd with much stronger Branches, than those Trees which have the full Advantage of Sun and Showers, and that are more fruitful and healthy; which must certainly be owing to the former Observation; as also to their drawing in a great Quantity of crude Moisture, which, though productive of Wood, is yet unkindly for Fruit. If, therefore, this be the Case, there is no Way of helping this, but by raising up the Trees, if they are young; or, if they are too old to remove, it is the better Way to root them out, and make new Borders of fresh Earth, and plant down young Trees; for it is a great Vexation to be at the Trouble and Expence of pruning and managing these Trees, without having the Pleasure of reaping any Advantage from them. Which will always be the Case, where the Trees are thus injudiciously planted. Or,

3^{dly}, This may proceed from the Trees wanting Nourishment, which is many times the Case, where they are planted in a hard, gravelly Soil, in which it is the common Practice to dig Borders three or four Feet wide, and three Feet deep into the Rock or Gravel; which is fill'd with good fresh Earth, into which the Trees are planted, where they will thrive pretty well for two Years, until their Roots reach the Gravel, where they are confin'd, as if planted in a Pot, and for want of proper Nourishment, the Branches do continually decay every Year: This cannot be help'd, where the Trees have been growing some Years,

Years, without taking them entirely up, or by digging away the Gravel from their Roots, and adding a large Quantity of fresh Earth, that may afford them a Supply of Nourishment. But where a Person intends to plant Fruit-Trees upon such a Soil, I would advise him never to dig into the Gravel, but, on the contrary, to raise the Borders, at least two Feet above it, with good fresh Earth, which, if made of a considerable Width, so that their Roots may have Room to extend themselves upon the Gravel, they will enjoy the kindly Influences of the Sun and Showers, and produce delicate, well-flavour'd Fruit in plenty.

But if the Unfruitfulness of the Trees do not proceed from any of the before-mention'd Causes, and is the Effect of unkindly Seasons; then the best Method yet known, is, in frosty dry Weather, when little Dew falls, to sprinkle the Blossoming-season; and while the young-set Fruit is tender, (which should always be done before Noon, that the Moisture may evaporate before the Night comes on); and if in the Night you carefully cover the Trees with Mats, Canvas, or some such light Covering, it will be of great Service to them. However, where the Trees are strong and vigorous, they are not so liable to suffer by a small Inclemency, as are those which are weak; so that there will be few Seasons in which there may not be Hopes of a moderate Quantity from them, tho' there should be no Covering used.

When your Fruit is set, and grown to the Bigness of a Small-Nut, you should go over the Trees, and thin them, leaving 'em at least five or six Inches asunder; for when they are permitted to remain in Bunches, as they are often produced, the Nourishment which should be employ'd wholly to the Fruits design'd to stand, will be equally spent amongst the whole Number, a great Part of which must be afterwards pull'd off; so that the sooner this is done, the better it will be for the remaining Fruit: And if it should sometimes happen that a Part of those left by any Accident should be destroy'd, yet the remaining ones will be much the larger and better-tasted for it, and the Trees will gain more Strength; for a moderate Quantity of Fruit is always preferable to a great Crop; the Fruit, when but few, will be much larger, better-tasted, and the Trees in a Condition to bear well the succeeding Years: whereas when they are over-charg'd with Fruit, it is always small, ill-tasted, and the Trees are generally so much weaken'd thereby, as not to be in a Condition for bearing well for three or four Years after. So that, upon the Whole, it is much better to have a lesser Number of Fruit, than is commonly esteem'd a Crop, than to have too many, since the Fruit, and also the Trees, are benefited thereby.

The farther Management of *Peach-trees* in Summer I have already mention'd, and shall only add a Word or two more upon that Head in this Place:

1st, That the Shoots being regularly train'd to the Wall as they are produc'd, the

Fruit will always be equally expos'd to the Sun and Air, by which it will be kept in a constant and equal State of Growing; whereas when they are over-shadow'd by luxuriant Branches for some Time, and afterwards expos'd to the Sun, by cutting off those Branches, their Skins will grow tough, and the Fruit be greatly retarded in its Growth.

2dly, By rubbing off and displacing irregular Shoots as they are produced, there will be no need to use a Knife to these Trees in Summer, which is what they are often greatly injured by; for when there are large Wounds made on these Trees, especially in Summer, it weakens them very much. Besides, (as I before said), by doing this early, the Sap of the Trees is not employ'd to nourish useless Branches.

3dly, I would advise, Never to shorten any of the Branches in Summer, unless it be to procure some Side-shoots to fill up a Vacancy of the Wall; and this should never be done after May, because the Shoots produced after that Time are never duly ripen'd, and so are no better than autumnal Branches.

When these Rules are duly executed, there will be no Occasion to pull off the Leaves of the Trees, to admit the Sun to the Fruit, which is too often practis'd; for if we consider, that the Leaves are absolutely necessary to cherish the Blossom-buds, which are always form'd at the Foot-stalks of the Leaves; so, by pulling them off before they have perform'd the Office assign'd 'em by Nature, is doing great Injury to the Trees: therefore I caution every one against that Practice.

PERSICARIA, [so call'd, because its Leaves resemble a *Peach*; It is also call'd *Hydro-piper*, of ~~the~~ *Water*, and *times* *Pepper*, because it is an Aquatick Plant, and has the Taste of Pepper.] Arsmart.

The Characters are;

It is a Plant with an apetalous Flower, having several Stamina (or Chives) which arise from the multifid Calix: The Pointal afterwards becomes an oval-pointed, smooth Seed, inclin'd in the Capsule which was before the Flower-cup: To which may be added, It hath jointed Stalks, and the Flowers are produced in Spikes.

The Species are;

1. **PERSICARIA**; *mitis*, *maculosa*. C.B.P. Dead, or Spotted Arsmart.

2. **PERSICARIA**; *vulgaris*, *acris*, seu *Hydro-piper*. J. B. Water-pepper, Lake-weed, or Arsmart.

3. **PERSICARIA**; *major*, *lapatbi foliis*, *calice*, *floris purpureo*. Tourn. Greater Arsmart, with Dock-leaves, and a purple Flower-cup.

4. **PERSICARIA**; *Orientalis*, *Nicotiana folio*, *calice florum purpureo*. T. Cor. Eastern Arsmart, with a Tobacco-leaf, and a purple Flower-cup.

There are several other Species of this Plant, which grow wild upon moist Soils and Dungs: hills in divers Parts of England: but as they are rarely cultivated in Gardens, and being Plants

Plants of no Use at present, so I omit enumerating of them in this Place.

The two first Sorts here mention'd are sometimes used in Medicine; the latter of which is a very sharp acrid Plant, from whence it had its Name of *Water-pepper* and *Arsmart*: This is a perennial Plant, which grows in great Plenty on the Sides of Ditches, and in moist Places, almost in every Part of *England*, and is a very bad Weed, if once it gets Possession in a Garden; for the Roots extend themselves greatly under-ground, and arise from every Joint (as doth *Couch-grass*) so that it is with great Difficulty extirpated.

The first is an annual Plant, that propagates itself in great Plenty from Seeds, which falling upon the Ground, rise in the succeeding *Spring*, and spread over the Ground, where-ever they are permitted to grow; so that they should not be suffer'd to remain in Gardens; These are both gather'd in the Fields in *Autumn* for Medicinal Use, when they are in Perfection.

The third Sort is cultivated in some curious Gardens for Variety, it making a handsome Appearance during the Season of its Flowering: This may be propagated by sowing the Seeds upon a Bed of rich moist Earth in *Autumn*, soon after they are ripe, and the Plants will come up the *Spring* following, when they may be transplanted into the Borders where they are to remain: This is also an annual Plant, which requires to be sown every Year, or the Seeds permitted to shed, which will grow better than those which are sown by Art.

The fourth Sort was brought from the Eastern Country by *Monf. Tournesort*, to the Royal Garden at *Paris*, from whence it hath been since communicated to several Parts of *Europe*. This Plant (though but an Annual) doth grow to be ten or twelve Feet high, and divides into several Branches, each of which produces a beautiful Spike of purple Flowers at their Extremities in the *Autumn*; which, together with its large green Leaves, and jointed Stalks, do make a very grand Figure in the Borders of large Gardens, late in the Season, when few other Plants are in Beauty.

The Seeds thereof should be sown in *Autumn* as soon as they are ripe; or if they are permitted to fall on the Ground, the Plants will come up the *Spring* following better than when they are sown by Art, (as was before observed); for if the Seeds are sown in the *Spring*, it is very rare that any of them succeed; and if some few Plants do come up from those Seeds sown at that Season, they seldom grow near so strong as those which are produced from the Seeds which fell in *Autumn*; so that there is no other Culture required to this Plant, but to transplant them out in the *Spring* where they are design'd to stand, which should be in large Gardens, giving them great Space; for if they are placed near other Plants, they will shade 'em entirely from the Sun, and, by continual dripping upon them, will greatly injure them; and if they stand too close, their Beauty is greatly diminished.

When the Plants begin to aspire upwards, (which is commonly in *July*) their Side-shoots should be pruned off, to make them advance in Height, and preserve them within Compass; otherwise they are very subject to branch out widely on every Side, so as to become troublesome in a Garden; but when they are pruned up regularly five or six Feet high, they may afterwards be permitted to shoot out Side-branches; since those which are produced above that Height, will never be very long or troublesome, but will add to the Beauty of the Plant: This delights in a rich moist Soil, upon which it will grow to a prodigious Height; it produces its Flowers in *September*, which continue in Beauty until the Frost destroys 'em.

PERVINCA; [so call'd, of *pervincere*, Lat. to overcome thoroughly, because it resists the Winter's Cold: It is also call'd *Clematis*, of *Κλίμαξ* to climb, because this Plant climbs upon those Plants which grow near it. It is also call'd *Daphnoides*, of *Daphne* a Laurel, because its Leaves resemble the Laurel. It was call'd *Vinca*, because Girdles were made of it at Weddings, or because it is good for Virgins.

It is call'd *Chamaedaphne*, of *χαμηλὴ* on the Ground, and *Δάφνη* a Laurel, q. d. little Laurel, because it lies on the Ground, and its Leaves resemble a Laurel.] Periwinkle.

The Characters are;

The Flower-cup consists of one Leaf, which is divided into five long, narrow Segments: The Flower also consists of one Leaf, which expands in the Form of a Salver, and is cut into five broad Segments: The Pointal, which arises from the Centre of the Flower-cup, becomes a Fruit compos'd of two Husks (or Pods) which contain oblong, cylindrical, furrow'd Seeds: To which may be added, That this Plant shoots out many long creeping Branches, which strike out Roots at their Joints.

The Species are;

1. **PERVINCA**; *vulgaris, angustifolia, flore cæruleo*. *Tourn.* Common or Narrow-leav'd Periwinkle, with a blue Flower.

2. **PERVINCA**; *vulgaris, angustifolia, flore albo*. *Tourn.* Common Periwinkle, with a white Flower.

3. **PERVINCA**; *vulgaris, latifolia, flore cæruleo*. *Tourn.* Greater Periwinkle, with a blue Flower.

4. **PERVINCA**; *vulgaris, angustifolia, flore rubente*. *Tourn.* Common Periwinkle, with a reddish Flower.

5. **PERVINCA**; *vulgaris, angustifolia, flore pleno, saturatè purpureo*. *Tourn.* Common Periwinkle, with a double Flower, of a deep purple Colour.

6. **PERVINCA**; *angustifolia, vulgaris, variegata, ex aureo & viridi*. *Boerb. Ind.* Common Periwinkle, with yellow strip'd Leaves.

7. **PERVINCA**; *angustifolia, vulgaris, variegata ex argenteo & viridi*. *Boerb. Ind.* Common Periwinkle, with silver-strip'd Leaves.

The first Sort grows wild in divers Parts of *England*, and is not so much cultivated in Gardens at present, as it was formerly, when

it was planted for edging of Borders; but the Shoots being very apt to root at their Joints, render'd it very difficult to preserve in any tolerable Order; and the Plants rooting deep in the Ground, do greatly exhaust the Goodness of the Soil, so that it is now almost wholly cast out of Gardens.

The second and fourth Sorts are Varieties from the first, differing only in the Colour of their Flowers; as are also the sixth and seventh, which differ in their variegated Leaves, for which they are preserved in the Gardens of those who admire strip'd Plants.

The fifth Sort produces fine double Flowers, which make a very handsome Appearance during its Season of Flowering, which renders it worthy of a Place in every good Garden.

The third Sort grows much larger than the former, and produces large blue Flowers: This is found in Woods and shady Places in divers Parts of *England*.

All these Plants multiply exceedingly by their Shoots from the old Roots, which trailing upon the Ground, do strike out Roots in a short Time, and may be taken off and transplanted where they are to remain: And tho' they are not so proper for a Flower-Garden, yet a few Roots of each Sort may be planted in shady Borders under Trees, where few other Plants will thrive, or in small Wildernesses; in which Places, if they are kept within Compass, they make a pretty Variety. The large Sort may be planted under Hedges, in Woods, &c. where it will grow four or five Feet high, and continue a long Time in flower.

These Plants propagate themselves by Roots so plentifully, that they seldom produce Fruit.

Monf. *Tournefort* says, He could never observe any Fruit upon them either in the Country adjoining to *Paris*, or in *Provence* or *Languedoc*, where they are very common, or in the Neighbourhood of *Lisbon*.

Of all the Botanical Writers before *Tournefort*, *Casalpini* is the only Person who found and describ'd this Fruit, which, he says, is oblong, being two forked Husks, arched and conjoin'd at their Extremities, containing, for the most part, two oblong Seeds in each.

To have this Plant produce Fruit, Monsieur *Tournefort* advises its being planted in a Pot that contains but a small Quantity of Earth; so that the Sap being prevented from dissipating and spending itself upon nourishing new Shoots, will mount the Stems, and swell the Pointal which becomes the Fruit; and this, he says, was the Method whereby he obtain'd the Fruit of this Plant, of which he has given a Figure in his *Elements of Botany*.

But notwithstanding what Monf. *Tournefort* has related concerning this Matter, yet I have often observ'd the Fruit upon such Plants as have grown singly on a good Soil; tho' where their Shoots are permitted to entangle with each other, and grow very close, there is seldom any Fruit produced.

PETALS, are the fine-coloured Leaves which compose the most conspicuous Parts of

a Flower: These are call'd in Latin *Petala*, to distinguish them from the Leaves of Plants, which are call'd *Folia*.

PETASITES; [it takes its Name of *πέταλον* to extend, because its Leaves are very broad; or of *πέταλον* a Cap, because its Leaves may serve instead of a Cap; for it has a certain Hollow in the Middle, and a hollow Expansion round that, so that it resembles a Bonnet.] Butter-bur.

The Characters are;

It is a Plant with a flosculous Flower, consisting of many Florets, divided into many Parts: sitting on the Embryo, and contain'd in a cylindrical Empalement, divided also into many Parts: The Embryo afterwards becomes a Seed furnish'd with Down: To which may be added, The Flowers appear before the Leaves.

The Species are;

1. **PETASITES**; major, & vulgaris. C. B. P. Common Butter-bur, or Pestilent-wort.

2. **PETASITES**; major, floribus pediculis longis insidentibus. Raii Syn. Greater Butter-bur, with long Foot-stalks to the Flowers.

3. **PETASITES**; albus, anguloso folio. J. B. White Butter-bur, with angular Leaves.

4. **PETASITES**; minor, alter, tussilaginis folio. H. R. Par. Lesser Butter-bur, with a Colt's-foot Leaf.

The first Sort here mentioned is used in Medicine: This grows wild in great Plenty by the Sides of Ditches, and in moist Soils, in divers Parts of *England*. The Flowers of this Plant appear in the Beginning of *March*; and after they are past, the green Leaves come up and grow to be very large.

The second Sort was found by Mr. *Jacob Bobart* in *Oxfordshire*, and sent to the Physick-Garden at *Chelsea*: This differs greatly from the former in its manner of Flowering; for the Flower-stems of this Sort rise near two Feet high, and the Flowers grow upon long Foot-stalks; whereas the Stems of the Common Sort do seldom rise above eight or ten Inches high, and the Flowers do closely surround the Stalks.

The other two Sorts are preserv'd in Botanic Gardens for Variety; but as they have little Beauty, so they are seldom propagated in other Gardens: They do all of them increase greatly by their creeping Roots, and, if plac'd in a moist Soil, will in a short Time over-run a large Compass of Ground.

PETROSELINUM; vide *Apium*.

PEUCEDANUM, [*Πευκεδάριον*, of *Πεύκη* the Pine-Tree, because the Leaves seem to resemble the Pine-tree.] Hogs-Fennel.

The Characters are;

It is a Plant with a Rose and umbellated Flower, consisting of many Petals placed orbicularly, and resting on the Empalement, which becomes a Fruit compos'd of two Seeds, which are almost plain, oval, gently streak'd, and border'd: To these Marks must be added, That the Leaves are winged, narrow, grassy, and divided into three Segments.

The

The Species are ;

1. PEUCEDANUM ; *majus, Italicum.* C. B. P. Greater Hogs-Fennel.

2. PEUCEDANUM ; *minus, Germanicum.* J. B. Lesser German Hogs-Fennel, or Sulphur-wort.

There are several other Species of this Plant, which are preserved in some curious Botanick Gardens : But as they are Plants of little Beauty or Use, so it would be needless to enumerate their several Varieties in this Place.

The first Sort here mention'd is not very common in England, being only to be found in some curious Gardens : But the second Sort (which is directed to be used in Medicine) is found wild in watery Places in several Parts of England.

These Plants may be cultivated by sowing their Seeds on a moist Soil in the Autumn soon after they are ripe, in which Place they will come strong the succeeding Spring, when they should be carefully weeded, and drawn out where they are too close, otherwise they will draw each other up very weak ; and the Autumn following they may be taken up, and transplanted where they are to remain, in which Place they should be planted at least two Feet asunder ; for their Roots will grow very large, and branch out greatly, when they have acquir'd Strength. The second Year after sowing they will produce Flowers and Seeds, but the Roots will abide many Years.

PHALANGIUM ; [this Plant is so call'd, because the Antients us'd it in Curing the Pricking or Stinging of Spiders ; *Tarantula.*] Spider-wort.

The Characters are ;

It is a Plant with a Lily-Flower, compos'd of six Petals, from whose Centre rises the Pointal, which afterwards becomes a roundish Fruit, divided into three Cells, and full of angular Seeds : To these Marks must be added a fibrose Root, in order to distinguish it from the Ornithogalum.

The Species are ;

1. PHALANGIUM ; *parvo flore, ramosum.* C. B. P. Branched Spider-wort, with a small Flower.

2. PHALANGIUM ; *parvo flore, non ramosum.* C. B. P. Unbranched Spider-wort, with a small Flower.

3. PHALANGIUM ; *Africanum, floribus luteis, parvis.* Raii Hist. African Spider-wort, with small yellow Flowers.

4. PHALANGIUM ; *parvo flore ramosum, foliis fistulosis, annuum.* H. L. Annual-branching Spider-wort, with fistulous Leaves, and a small Flower.

5. PHALANGIUM ; *Africanum, foliis cepa- ceis, floribus spicatis aureis.* Boerb. Ind. African Spider-wort, with Onion Leaves, and Golden Flowers, growing in Spikes, falsely call'd an Aloe.

6. PHALANGIUM ; *Æthiopicum, ramosum, floribus albis, petalis reflexis.* Hort. Amst. Branchy Ethiopian Spider-wort, with white Flowers, whose Petals are turn'd backward.

The first and second Sorts are abiding Plants, which are propagated in curious Gar-

dens, for the sake of their Flowers ; and tho' they are not very beautiful, yet, for their long Continuance in Flower, they deserve a Place in the open Borders of every curious Flower-Garden.

These may be propagated either from Seeds, or by parting their Roots : The best Time to sow the Seeds is in Autumn, soon after they are ripe, in the Manner directed for Bulbous-rooted Flowers, with which these Plants do agree in their Culture, and the second Year after sowing they will produce Flowers. The Season for parting their Roots is in September ; in doing of which, you must observe to preserve a good Head to each Off-set, and not to divide them too small, which will cause them to flower weak the following Summer : They delight in a fresh light Earth, and an open Situation.

The third Sort is an annual Plant, which should be sown on a Bed of light Earth in March ; and when the Plants are come up, they must be transplanted where they are to remain, in which Place they must be kept clear from Weeds, which is all the Culture they require : They produce their Flowers in July, and their Seeds are perfected in August.

The fourth Sort is also annual, but grows very large, in comparison to the last : This commonly rises two Feet high, and divides into many Branches, each of which produces a Spike of Flowers : It is a very hardy Plant ; and if the Seeds are permitted to fall in Autumn, they will come up in the Spring, and produce much stronger Plants, than if sown at that Season, and will flower much sooner : This must have a light dry Soil.

The fifth Sort is preserv'd in Green-houses, with other succulent Plants, amongst which it makes a pretty Variety, there being scarcely a Month in the Year when there are not some of the Spikes of Flowers in Beauty. This was formerly call'd an Aloe, which Name is still retain'd by unskilful Persons, tho' it is vastly different therefrom in its whole Appearance. This Plant multiplies very fast by Off-sets, which tho' produced at some Distance from the Earth, yet do emit Roots of a considerable Length ; and when planted, do immediately take in the Earth : They should be planted in Pots of light sandy Earth, and housed in Winter, with *Ficoides's*, and other hardy succulent Plants, where they may have free open Air ; for they are hardy, and require only to be protected from Frost.

The sixth Sort is also preserved in some curious Gardens, with other Exotick Plants, in the Green-house : This is multiply'd by parting the Roots ; the best Season for doing this is in August, when the Leaves are decay'd ; they should be planted in Pots fill'd with light sandy Earth, and housed in Winter with the last : This produces large-branching Stems, which are thinly beset with Flowers, that have their Petals reflex'd, and are of a whitish Colour, but continue a long Time in Beauty.

PHASEOLOIDES, [of *Phaseolus*, Lat. and *Eise*, Gr. *Shape*.] Kidney-bean Tree ; *vulgô*. The

The Characters are ;

It hath a papilionaceous Flower, out of whose Empalement rises the Pointal, which afterwards becomes a long Pod, inclosing several Seeds which are shap'd almost like a Kidney : To which must be added, That it hath pennated Leaves, consisting of an unequal Number of Lobes, which distinguishes it from Phaseolus.

We have but one Species of this Plant at present in England, which is ;

PHASEOLOIDES ; *Carolinianum, frutescent, scandens, foliis pinnatis, floribus caeruleis spicatis.* Carolina Kidney-bean Tree ; *vulgô.*

The Seeds of this Plant were sent from Carolina by Mr. Catesby, in the Year 1724, and distributed to several curious Persons near London ; from which many Plants have been rais'd, which are very hardy, and propagate very easily by laying down the tender Branches, or from Suckers, which are sent from the Root in great Plenty.

The best Season for transplanting these Plants is in the Spring, just before they shoot : They will grow in almost any Soil, but thrive best in a rich light Earth.

This Plant is very proper to place among other climbing Shrubs in small Wildernesse Quarters, where if it be supported with strong Stakes, it will rise twelve or fourteen Feet high, and produce many Spikes of fine blue Flowers ; and if the Season prove favourable, the Seeds will ripen very well : It is extreme hardy, enduring the severest Cold of our Climate in the open Air, provided it be not too much expos'd to the cold Winds.

PHASEOLUS, [takes its Name from *αἰώμα*, a long, swift Ship, because the Husk of this Plant resembles such a Ship.] Kidney Bean.

The Characters are ;

It is a Plant with a papilionaceous Flower, out of whose Empalement rises the Pointal, which afterwards becomes a long Pod, pregnant with Seeds, for the most Part shap'd like a Kidney or Oval : To these Notes are to be added Leaves growing by three's on each Pedicle, and the Plant for the most Part climbing.

It would be to little Purpose to enumerate all the Varieties of this Plant which have come to knowledge, in this Place ; since America does annually furnish us with new Sorts ; so that there is no knowing what Varieties there may be produced in England : Besides, as they are not likely to be much cultivated here, since the old Sorts are preferable to any of the new ones, for the Kitchen ; therefore I shall only first set down a few Sorts which are cultivated for their Flowers, or as Curiosities, and then mention those which are most esteem'd for the Table.

1. PHASEOLUS ; *Indicus, flore coccineo, seu puniceo.* Mor. Hist. The Scarlet Bean.

2. PHASEOLUS ; *Americanus, perennis, flore cochleato odorato, seminibus fuscis orbiculatis, Caracalla dictus.* H. L. Perennial American Kidney-Bean, with sweet-smelling cochleated Flowers, commonly call'd Caracalla.

3. PHASEOLUS ; *Americanus, strumosa radice, flore purpureo, siliqua angustissima.* Plum. American Kidney-Bean, with a strumose Root, a purple Flower, and a very narrow Pod.

4. PHASEOLUS ; *Canadensis, purpureus, minor, radice vivaci.* Schol. Bot. Small Purple Kidney-Bean, with a perennial Root.

5. PHASEOLUS ; *arbor, Indica incana, siliquis torosis, Kayan dicta.* Raii Hist. Indian Hoary-Tree Kidney-Bean, with swelling knotted Pods, commonly call'd Pigeon-Pea.

The first of these Plants is very common in the English Gardens, being planted for the Beauty of its scarlet Flower : This Plant spreads itself very far, so that it should be allow'd Room, otherwise it will over-run whatever Plants grow near it. The Season for planting the Seeds of this Plant is in the Beginning of April, observing always to do it in dry Weather, otherwise the Seeds will burst and rot : They will produce their Flowers by the Beginning of July, and will continue flowering until the Frost prevents them ; and their Seeds will ripen in September, when they should be gathered, and preserv'd in a dry Place until the succeeding Spring, in order to be sown. This Plant being annual, perishes with the first Approach of Winter : It will thrive very well in the City, the Smoak of the Sea-coal being less injurious to this Plant than most others, so that it is often cultivated in Balconies, &c. and being supported either with Sticks or Strings, grows up to a good Height, and produces its Flowers very well : It is also planted in some Gardens, to cover Arbors and other Seats in the Summer-season, to afford Shade, for which Purpose it will do very well : But the Seeds must be put in where they are to remain ; for the Plants don't bear to be transplanted well.

The second Sort is an abiding Plant, which may also be propagated by Seeds, which should be sown in a moderate Hot-bed in the Spring ; and when they come up, they must be carefully transplanted into Pots fill'd with light fresh Earth, which must be plung'd into a Hot-bed to facilitate their taking Root ; after which, they should be inured to bear the open Air by Degrees, into which they should be remov'd when the Season is warm, placing them in a shelter'd Situation ; and as they advance, so should they be remov'd into larger Pots, which must be fill'd up with fresh light Earth.

During the Summer-season it must be frequently refresh'd with Water ; but in Winter it must be remov'd into the Greenhouse, and should have but little Water during that Season. It requires only to be screen'd from Frost, but must have open free Air whenever the Weather will permit, otherwise the Leaves will grow mouldy, and decay the tender Shoots : It produces its scarlet Flowers in July and August, but seldom perfects its Seeds in this Country. This Plant is very common in Portugal, where it is planted to cover Arbors and Seats in Gardens, for which it is greatly esteem'd by the Inhabitants of that Country, and for its beautiful sweet-

sweet-smelling Flowers; and in that Country it thrives very well in the open Air.

The third Sort is preserv'd in some curious Gardens for Variety; but is a Plant of no great Beauty: This may be propagated by sowing the Seeds in the *Spring* upon a Hot-bed; and when they come up, they must be planted in Pots, and treated as the former Sort: It produces its Flowers in *July*, and the Seeds ripen in *September*.

The fourth Sort was brought from *America*, and is preserv'd in curious Gardens, for the sake of its long Flowering: This is an abiding Plant, and should be manag'd as was directed for the third Sort: and if guarded from Frost, will continue to produce Flowers all the *Winter*-season: It ripens Seeds very well, from which the Plants may be easily propagated.

The fifth Sort is preserv'd as a Curiosity in *England*: but in the *West-Indies* it is frequently planted by the Sides of Alleys in Gardens, to form a Hedge, where they will last many Years without decaying; and will thrive on barren Land which has been worn out, where scarcely any thing else will prosper, and produce a great Quantity of Fruit, which are sometimes eaten by the Inhabitants; but their chief Use is to feed Pigeons, from whence this Plant had its Name. The Branches, with the ripe Peas and Leaves, are given to Hogs, Horses, and most other Cattle, which fattens them very much. In *England* it is preserv'd in Stoves, being too tender to be kept without artificial Heat in this Climate: It may be propagated from Seeds, (which are generally brought from the *West-Indies* every Year in great Plenty); and when the Plants come up, they should be planted into Pots fill'd with light sandy Earth, and plung'd into a Hot-bed, to promote their Growth: but when they have acquir'd Strength, they should be gradually inur'd to the open Air, into which they may be removed in *July*, and may remain abroad until the Beginning of *September*, when they must be remov'd into the Stove, placing them where they may have a moderate Heat, observing to refresh 'em now and then with a little Water; but be very careful not to give it to them in great Quantities, (especially at that Season), which will be very apt to rot their Roots: The second Year these Plants will flower early in the *Spring*, and do many times produce ripe Fruit.

There are at present but three Sorts of *Kidney-Beans*, which are cultivated for the Table in *England*, which are:

1. The Common White, or Dutch Kidney-Bean.
2. The Lesser Garden Kidney Bean, commonly call'd, The Battersea Bean.
3. The Upright, or Tree Kidney Bean.

The first of these was formerly more cultivated in *England* than at present; but is the chief Sort now cultivated in *Holland*, from whence, probably, it had the Name of *Dutch Kidney Bean*: This Sort rises to a very great Height, and requires to be supported by tall Stakes, otherwise they will spread upon the Ground and rot; so that where this Care is

wanting, the Fruit seldom comes to good: which Trouble renders it difficult to cultivate this Sort in Plenty; and the Beans being much broader than the small Sort, render them less valuable in the *London* Markets; which, I suppose, occasion'd their being neglected in *England*.

The second Sort is that which is most commonly cultivated in the Gardens near *London*, and is by far the best Sort we yet know; for the Plant never rambles too far, but is always of moderate Growth, so that the Air can easily pass between the Rows, and keep them from rotting: It is also a plentiful Bearer, and the best Bean of all the rest for eating.

The third Sort is also a plentiful Bearer, and never rambles, growing upright in form of a Shrub; but the Beans are much larger than the last, and are not so well colour'd, nor do they eat near so firm and crisp; for which Reasons they are not so generally esteem'd.

These Plants are propagated from Seeds, which must be sown in the Place where they are to remain; for they will not bear transplanting, except it be done while they are very young; and this being pretty troublesome, is very seldom practis'd, unless for a few early Plants under warm Hedges or Walls, but it is not worth while for the general Crops.

The Season for putting these Seeds in the Ground, is the latter-end of *March*, or the Beginning of *April*, for an early Crop; but these should have a warm Situation, and a dry Soil, otherwise they will not succeed: you should also observe to put them into the Ground at a dry Season; for Wet so early in the Season will rot the Seeds in the Ground. The manner of planting them, is, to draw shallow Furrows with a Hoe, at about two Feet and an half Distance from each other, into which you should drop the Seeds about two Inches asunder; then with the Head of a Rake draw the Earth over them, so as to cover them about an Inch deep.

If the Season be favourable, the Plants will begin to appear in about a Week's time after sowing, and soon after will raise their Heads upright; therefore if the Stems thereof are pretty tall above-ground, you should gently draw a little Earth up to them, observing to do it when the Ground is dry, which will preserve them from being injured by sharp Winds: but you should be careful not to draw any of the Earth over their Leaves, which would rot them, or at least greatly retard their Growth. After this, they will require no farther Care but to keep them clear from Weeds until they produce Fruit, when they should be carefully gather'd two or three times a Week; for if they are permitted to remain upon the Plants a little too long, the Beans will be too large for eating, and the Plants wou'd be greatly weaken'd thereby.

This first Crop of *Kidney Beans* will continue a Month in good Order, during which time they will produce great Plenty of Beans; therefore, in order to have a Succession of them throughout the Season, you should sow at three different Times, viz. in *March* or

April, in *May*, and toward the latter-end of *June*; which last Crop will continue until the Frost comes on, and destroys 'em.

There are some Persons who raise these in Hot-beds, in order to have them very early: The only Care to be taken in the Management of these Plants, when thus rais'd, is to allow them Room, and give 'em as much Air as can be conveniently, when the Weather is mild; as also to let 'em have but a moderate Heat; for if the Bed be over-hot, they will either burn, or be drawn up so weak as never to come to good.

The Manner of making the Hot-bed being the same as for Cucumbers, &c. need not be repeated in this Place: but only observe, when the Dung is equally levell'd, to lay the Earth about four or five Inches thick; and let the great Steam of the Bed pass off before you sow the Seeds: The Time for doing this, must be proportion'd to the Season when you would have the Beans for the Table; but the surest Time for a Crop, is about a Week in *February*.

It is also a good Method which some use, to have *French Beans* earlier than they can be obtain'd in the common Ground, To make a gentle Hot-bed about the Middle of *March*, which may be arched over with Hoops, and cover'd with Mats, in this they sow their *Kidney Beans* in Rows pretty close together, so that a small Bed will contain a great Number of Plants; these they bring up hardily, inuring 'em to the open Air by Degrees; and in the Beginning of *April*, when the Weather is settled, they prepare some warm Borders under Walls or Hedges; then they take them up from the Hot-bed, preserving as much Earth as possible to their Roots, and plant them in the Borders at the Distance they are to remain: These, if they take Root kindly, will produce Beans at least a Fortnight before those sown in the common Ground.

The Manner of saving the Seeds of these Plants, is to let a few Rows of them remain ungather'd in the Height of the Season; for if you gather from the Plants for some time, and afterwards leave the Remaining for Seed, their Pods will not be near so long and handsome, nor will the Seed be so good: In the *Autumn*, when you find they are ripe, you should in a dry Season pull up the Plants, and spread them abroad to dry; after which, you may thrash out the Seed, and preserve it in a dry Place for Use.

PHILLYREA; [*φιλύρεα*.] Mock-Privet.

The Characters are;

The Leaves grow by Pairs opposite to each other, and are Ever-green: The Flower consists of one Leaf, is Bell-shap'd, and divided into four Parts at the Top: The Pointal, which rises from the Centre of the Flower-cup, afterwards becomes a spherical Flower containing one round Seed.

The Species are;

1. **PHILLYREA**; *latifolia laevis*. C. B. P. The Broad-leav'd true *Phillyrea*.

2. **PHILLYREA**; *latifolia, spinosa*. C. B. P. Hlex-leav'd *Phillyrea*; vulgò.

3. **PHILLYREA**; *folio Alaterni*. J. B. *Phillyrea*, with an *Alaternus* Leaf.

4. **PHILLYREA**; *folio ligustri*. C. B. P. Privet-leav'd *Phillyrea*.

5. **PHILLYREA**; *angustifolia, prima*. C. B. P. Narrow-leav'd *Phillyrea*.

6. **PHILLYREA**; *angustifolia, secunda*. C. B. P. Rosemary-leav'd *Phillyrea*; vulgò.

7. **PHILLYREA**; *Olea Ephefiacæ, folio*. Hort. Cbels. Pluk. Phyt. Olive-leav'd *Phillyrea*.

8. **PHILLYREA**; *latifolia laevis, foliis ex luteo variegatis*. Cat. Plant. Hort. The true *Phillyrea*, with strip'd Leaves.

These Plants are most of them Natives of the Southern Parts of *France*, *Spain*, and *Italy*, but are hardy enough to endure the Cold of our Climate in the open Air: They have been formerly in great Request for Hedges, and to cover Walls; for both which Purposes they are very improper; because they shoot so fast in the *Spring* and *Summer* Months, that it is very troublesome to keep such Hedges in Order: besides, all these Sorts with broad Leaves do naturally produce their Branches so far asunder, that they can never be reduc'd to a thick handsome Hedge; for altho' by frequently clipping the extreme Parts of the Shoots you force out some Side-Branches, which render it thick on the Outside, yet the Inner Branches are very far asunder, and being of a pliable Nature, are often displac'd by strong Winds; or if there happen to fall much Snow in *Winter*, so as to lie upon these Hedges, it often displaces them so much as not to be recover'd again in some Years; for which Reasons they are not so much in use for Hedges as they were some Years past: nor are they so often planted to cover Walls; for it is a very difficult Task to keep them close to the Wall; for their Branches being vigorous, do commonly grow to some Distance from the Wall, and harbour all sorts of Insects and Filth: besides, their Leaves being large, and growing pretty far asunder upon the Branches, they appear naked, especially when they are kept closely clipt.

But all these Sorts of Trees are very proper to intermix with other Ever-greens, to form Clumps, Amphitheatres, or to plant round the Sides of Wildernesses of Ever-green Trees, where being placed among other Trees of the same Growth, they will afford a pleasing Variety.

The three first Sorts will grow to the Height of twenty Feet, or more, and may be train'd up to regular Heads: but the narrow-leav'd Sorts seldom rise above fourteen or sixteen Feet high with us; so that they will be of a proper Size to place in a Line before the Broad-leav'd Sorts, where being intermix'd with *Hollies*, *Alaternus's*, *Arbutus's*, and some other Sorts, they will make a beautiful Prospect.

These Plants are propagated either from Seeds or Layers; but the latter being the most expeditious Method in *England*, is chiefly preferr'd: The best time to lay them down is

is in *March*, when you should dig the Ground round the Plants intended to lay, making it very loose; then making choice of a smooth Part of the Shoot, you should make a Slit upwards, (in the manner as is practis'd in laying of *Carnations*); and then bend the Branch gently down to the Ground, making a hollow Place with your Hand to receive it, and having placed the Part which was slit in the Ground, so as that the Slit may be open, you should fasten it down with a forked Stick, that it may remain steady, covering that Part of the Branch with Earth about three Inches thick, observing to keep the upper-part erect. In dry Weather these Layers should be water'd, which will greatly facilitate their Rooting; you must also keep 'em clear from Weeds, which if suffer'd to grow up amongst them, will prevent their taking Root.

The *March* following many of these Plants will be rooted, at which time they may be taken off, and carefully planted in a Nursery, where they may be train'd up three or four Years in the manner you intend them to grow; during which time you should dig the Ground between the Rows, and cut about the Roots of the Plants every Year, which will cause 'em to strike out strong Fibres, so as to support a good Ball of Earth when they are remov'd; you should also support their Stems with Stakes, in order to make them straight, otherwise they are very apt to grow crooked and unsightly.

When the Plants have been thus manag'd three or four Years, you may transplant them into the Places where they are design'd to remain: The best time for this Work is the latter-end of *March*, or the Beginning of *April*, just before the Plants begin to shoot: but in removing them, you should dig round their Roots, and cut off all downright or strong Roots which have shot out to a great Distance, that you may the better preserve a Ball of Earth to each Plant, otherwise they are subject to miscarry: And when you have plac'd them in their new Quarters, you should lay some Mulch upon the Surface of the Ground, to prevent its drying; and give them some Water twice a Week in very dry Weather: but do not repeat it too often when the Season is favourable, nor give it to them in too great Quantities, which will rot the new Fibres, and prevent their Growth. You should also support the Plants with Stakes until they have taken fast hold of the Earth, to prevent their being turn'd out of the Ground, or displac'd by the Winds, which will destroy the Fibres that were newly put out, and greatly injure the Plants. These Trees delight in a middling Soil, which is neither too wet and stiff, nor too dry; tho' the latter is to be preferr'd to the former, provided it be fresh.

The Sort with strip'd Leaves is at present pretty rare, and somewhat tenderer than the others (as are most Sorts of variegated Plants less capable to endure the Cold, than those of the same kinds which are plain; the striping of Plants always proceeding from their Weak-

ness: This is preserv'd in some Gardens as a Curiosity, but may be propagated in the same manner with the former.

Those Sorts with small Leaves, are commonly two Years before they take Root when lay'd, therefore they should not be disturb'd sooner; for the raising them out of the Ground does greatly retard their Rooting.

PHLOMIS; [*φλωμ*; so call'd, of *φλέω* to burn, because in old Time the Peasants us'd to burn these Plants to enlighten their Chambers: It is also call'd *Herba Venti*; because growing in Mountains, the Leaves of it are torn by the Wind.] The Sage-Tree, or Jerusalem-Sage.

The Characters are;

It hath a labiated Flower consisting of one Leaf, whose Upper-lip (or Helmet) which is crested, does wholly rest upon the Under-lip (or Beard), which is divided into three Parts, and extends a little beyond the Upper-lip: The Pointal rises out of the Flower-cup, accompany'd with four Embryo's, which afterwards become so many oblong Seeds, shup up in a Husk, or a pentagonal Tube, which was before the Flower-cup.

The Species are;

1. **PHLOMIS**; *fruticosa, salvia folio, latiore & rotundiore*. Tourn. Broad-leav'd Sage-Tree; *vulgô*.

2. **PHLOMIS**; *fruticosa, salvia folio, longiore & angustiore*. Tourn. Narrow-leav'd Sage-Tree; *vulgô*.

3. **PHLOMIS**; *fruticosa, humilis, latifolia, candidissima, floribus luteis*. Aët. Phil. Low Shrubby Sage-Tree, with broad hoary Leaves, and yellow Flowers.

4. **PHLOMIS**; *Narbonensis, Hormini folio, flore purpurascens*. Tourn. Narbon Jerusalem Sage, with a Clary Leaf, and purplish Flower.

5. **PHLOMIS**; *Hispanica, candidissima, herbacea*. Tourn. Spanish Jerusalem Sage, with very hoary Leaves.

6. **PHLOMIS**; *Lychnitis*. Clus. Hist. Narrow-leav'd Jerusalem Sage.

7. **PHLOMIS**; *Samia, herbacea, lunaria folio*. T. Cor. Herbaceous Samian Jerusalem Sage, with a Moonwort Leaf.

8. **PHLOMIS**; *Orientalis, foliis laciniatis*. T. Cor. Eastern Jerusalem Sage, with jagged Leaves.

9. **PHLOMIS**; *Orientalis, lutea, herbacea, latifolia, verticillata*. Aët. Phil. Broad-leav'd Herbaceous Jerusalem Sage from the Levant, with yellow Flowers growing in Whorles.

The three first-mention'd Sorts grow to be Shrubs of a middling Size, and are proper to intermix with other Sorts of Plants which are of the same Growth in small Wilderness Quarters, where, by the Diversity of their hoary Leaves, their large Spikes of yellow Flowers, and their long Continuance in flower, they make an agreeable Variety.

These Plants have been preserv'd in Pots, and placed in the Green-house in Winter among other tender Exoticks: but they are hardy enough to endure the Cold of our ordinary

nary Winters in the open Air, provided they are planted in a dry Soil, and have a warm Situation; and are rarely injured by Cold, unless in a very severe Frost.

They are propagated by Cuttings in this Country; for their Seeds do seldom ripen well in England, except in very warm dry Seasons. The best time to plant these Cuttings is in May, that they may have good Roots before Winter: They should be planted in a Bed of fresh light Earth, and shaded from the Sun until they have taken Root; after which, they will require no farther Care, but only to keep them clear from Weeds until the following Spring, when they may be removed to the Places where they are design'd to be continu'd.

The best Season for transplanting them is in March, before they begin to shoot, observing to preserve a Ball of Earth to the Root of each Plant, as also to water 'em until they have taken Root: And in order to form them into a regular Shape, they should be stak'd, and their Stems kept constantly fasten'd thereto, until they arrive at the Height you design 'em; then you may suffer their Branches to shoot out on every Side, to make a handsome Head; in order to which, you should prune off such Branches as grow irregular to either Side, which must always be perform'd in Summer; for if they are wounded in Winter, the Cold does often injure the Plants, by entering the Wounds.

The Soil in which they are placed should not be dung'd, for that causes them to grow too fast, whereby their Shoots are too replete with Moisture, and so less capable to endure the Cold; whereas if they are planted upon a dry, barren, rocky Soil, they are seldom injured by Cold, which is the Case of most of the same Class of Plants with Lip-flowers.

The other Sorts are all of them propagated by parting of their Roots, which should be done in the Spring of the Year, observing to preserve a leading Bud to each Off-set: These should also be placed in a dry, rocky, or gravelly Soil, in which they will thrive much better than if planted in a richer Ground, and will endure the Cold of our ordinary Winters extremely well in the open Air.

These are Plants of no great Beauty, but are preserved in the Gardens of those who are fond of Variety. A Tea made with the Leaves of these Plants, is accounted very good for sore Throats.

PHYTOLACCA: [This Plant is so call'd, of *phus* a Plant, and *Lacca*, a Colour, because a Red Colour like *Lacca* is made thereof.] American Nightshade.

The Characters are;

The Flower consists of several Leaves, which are placed in a circular Order, and expand in form of a Rose; out of whose Centre rises the Pointal, which afterwards becomes a soft Fruit, or almost globular Berry full of Seeds, placed orbicularly: To which should be added, that the Flowers and Fruit are produced on a Bunch like Currants.

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The Species are;

1. **PHYTOLACCA;** *Americana, majori fructu.* Journ. American Nightshade, with large Fruit, commonly call'd Virginian Poke or Porke Physick.

2. **PHYTOLACCA;** *Americana, minori fructu.* Journ. American Nightshade, with lesser Fruit.

The first of these Plants is very common in Virginia, New-England, and Maryland, where the Inhabitants take a spoonful or two of the Juice of the Root, as a familiar Purge: The Berries thereof are full of a purple Juice, which gives a fine Tincture to Paper, from whence it hath the Name; but it will not abide long.

It may be propagated by sowing the Seeds in the Spring upon a Bed of light rich Earth; and when they come up, they should be transplanted into a Bed of rich dry Earth about two Feet asunder; for they grow to be very large, especially if the Soil be good. When they have taken Root, they will require no farther Care but only to clear 'em from Weeds, and in the Autumn they will produce their Flowers and Fruit: but when the Frost comes on, it will cut down the Tops of these Plants, which constantly decay in Winter; but their Roots will abide in the Ground, and come up again the succeeding Spring. There is no great Beauty in this Plant; but, for Variety, a few of them may be placed in the Borders of large Gardens, since they require but little Culture.

The Sort with lesser Fruit is tenderer than the former, and requires to be placed in an artificial Heat in Winter, otherwise they will not endure the Cold of our Winters in England: This is also propagated from the Seeds, which should be sown upon a moderate Hot-bed in the Spring; and when the Plants come up, they should be transplanted each into a separate small Pot fill'd with light fresh Earth, and plung'd into another moderate Hot-bed to bring them forward: but when they have acquired some Strength, they should be inured to bear the open Air by Degrees, into which they may be removed in July, observing to shift them into larger Pots, as their Roots shall require, and place them where they may be shelter'd from strong Winds.

In this Situation they may remain 'till the Beginning of September, when they should be remov'd into the Stove, placing them where they may have a temperate Warmth; and during the Winter Season you should frequently refresh them with Water, but they must not have it in too great Quantities.

These Plants will grow to be three Feet high, and may be train'd up with regular Stems and Heads; they will continue three or four Years, if carefully preserv'd, and continue to produce Bunches of small scarlet Berries throughout the whole Year; which affords a pleasing Variety, amongst other Exoticks in Winter, when few other things are in Beauty: The Berries thereof are full of a beautiful red Juice, which will stain Paper extremely fine, but will not continue.

PILO-

PILOSELLA; *vide* Hieracium.

PIMPINELLA. [This Plant is called *Pimpinella* for *Bipinella*, because its Leaves grow or adhere to the Stalks by Pairs, and are dispos'd like Feathers; it is also called *Sanguisorba*, because it stanches Blood] Burnet.

The Characters are;

The Flower consists of one Leaf, which expands in a circular Form, and is generally cut into four Segments, to the Center, accompanied with many Chives, or a tufted Pointal; the Flower-cup afterwards becomes a Fruit, for the most part sharp-pointed and Quadrangular; having sometimes but one Cell, and at other times two Cells, which are full of oblong Seeds.

The Species are;

1. PIMPINELLA; *sanguisorba*, *minor lævis*. C. B. P. Common or lesser Burnet.
2. PIMPINELLA; *sanguisorba*, *major*. C. B. P. Great Burnet.
3. PIMPINELLA; *major*, *præalta*, *auriculata*, *Sabauda*. Bocc. Musf. Great rigid tall Burnet, with auriculated Leaves.
4. PIMPINELLA; *maxima*, *Canadensis*, Corn. Greatest Canada Burnet.

There are some other Species of this Plant, which are preserved in curious Botanick Gardens for Variety: But those here mentioned are what I have observed in the English Gardens.

The common Burnet is found wild in great Plenty upon dry chalky Hills, in divers Parts of England: yet is often cultivated in Gardens for medicinal Uses; though the Herb gather'd on its native Place of Growth, is much stronger, and fitter for such Purposes.

The second Sort is found growing in moist Meadows, and other wet Soils in divers Parts of England; and is rarely cultivated in Gardens.

The other two Sorts are Strangers to our Country, but are hardy enough to endure the Cold of our Climate in the open Air. These may be propagated either by sowing of the Seeds, or parting their Roots.

The best Time for parting their Roots, is in the Autumn, that they may take good Root before the Drought of the Spring hinders their Growth. They should be planted in Beds of light dry Earth, about ten Inches or a Foot asunder, for if they have not Room to spread, they will rot each other. In May they will shoot up to flower; but if you would preserve the Roots, the Stems should be constantly cut off, for if they are permitted to seed, they seldom remain long after.

They may also be propagated by sowing their Seeds upon a Bed of light Earth in the Spring, and when the Plants are come up, they should be transplanted out into a Bed of fresh Earth, at the Distance before-mention'd, observing to water and shade them until they have taken Root, after which they will require no farther Care, but to keep them clear from Weeds. The first Sort is what should be used in Medicine, and the Leaves of that are also put into cool Tankards in the Heat of Summer, as a Cordial Herb.

PINASTER; *vide* Pinus Sylvestris.

PINUS. The Pine Tree.

The Characters are;

It hath amentaceous Flowers (or Catkins) which are produced at remote Distances from the Fruit on the same Tree; the Seeds are produced in squamous Cones; to which should be added, that the Leaves are longer than those of the Fir-Tree, and are produced by Pairs out of each Sheath.

The Species are;

1. PINUS; *sativa*. C. B. P. The manured Pine.
2. PINUS; *sylvestris*. C. B. P. The Pinaster or wild Pine.
3. PINUS; *sylvestris*, *foliis brevibus*, *glaucis*, *conis parvis*, *albis*. Ray. Hist. The Scotch Pine, commonly called the Scotch Fir.
4. PINUS; *Americana*, *foliis prælongis*, *subinde ternis*, *conis plurimis confertim nascentibus*. Rand. American Pine, with longer Leaves coming out by Threes, and many Cones growing in a Cluster, commonly called The Cluster Pine.
5. PINUS; *Americana*, *ex uno folliculo setis*, *longis tenuibus*, *triquetris*, *ad unum angulum*, *per totam longitudinem*, *minutissimis crenis asperatis*. Pluk. Amaltb. Lord Weymouth's Pine; *vulgô*.

The Culture and Management of these Trees, being the same as for Firs, is fully set down adjoining to that Article, for which the Reader is desired to turn back to *Abies*.

PISTACHIA; *vide* Terebinthus.

PISUM [Some are of Opinion, that this Plant takes its Name from the City *Pisa*, where it antiently grew in great Plenty; others derive it from *πίσω*, he fell, because if this Plant be not supported, it will fall to the Ground.] Pea.

The Characters are;

It is a Plant with a papilionaceous Flower, out of whose Empalement rises the Pointal, which afterwards becomes a long Pod, full of roundish Seeds; to which must be added, fistulous Stalks, for the most part weak, which the Leaves embrace in such a Manner, that they seem to be perforated by them; but the other Leaves grow by Pairs along the Mid-rib, ending in a Tendril.

The Species are;

1. PISUM; *hortense majus*, *flore frutueque albo*. C. B. P. The greater Garden Pea with white Flowers and Fruit.
2. PISUM; *præcox*, *Anglicum*. Boerb. Ind. Hot-spur Pea; *vulgô*.
3. PISUM; *humile*, *caule firmo*. Tourn. The Dwarf Pea.
4. PISUM; *humile Gallicum*. Boerb. Ind. French Dwarf Pea.
5. PISUM; *cortice eduli*. Tourn. Pea with an esculent Husk.
6. PISUM; *siliqua carnosâ*, *incurvâ*, *seu falcata*, *eduli*. Raii. Hist. The Sickle Pea; *vulgô*.
7. PISUM; *arvense*, *fructu albo*. C. B. P. Common white Pea.

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8. PISUM

8. *Pisum*; *arvense*, *fructu viridi*. C. B. P. Green Rouncival Pea.

9. *Pisum*; *arvense*, *fructu cinereo*. C. B. P. The Grey Pea.

10. *Pisum*; *arvense*, *flore roseo*, *fructu variegato*. *Rail Hist.* Maple Rouncival Pea.

11. *Pisum*; *umbellatum*. C. B. P. The Rose Pea or Crown Pea.

12. *Pisum*; *maximum*, *fructu nigra lineâ maculato*. *H. R. Par.* The Spanish Morotto Pea.

13. *Pisum*; *bortense*, *siliquâ maximâ*. *H. R. Par.* The Marrow-fat or Dutch Admiral Pea.

14. *Pisum*; *fructu maximo*, *ex viridi obsoletis*. *Boerb. Ind.* The Union Pea.

15. *Pisum*; *spontanæum*, *maritimum Anglicum*. *Park. Theat.* English Sea Pea.

16. *Pisum*; *arvense*, *fructu luteo virescente*. C. B. P. Pig Peas.

There are several other Varieties of the Garden Peas, which differ in the Colour of their Flowers and Fruit, and are by some Persons distinguished by Names as distinct Sorts; but as they are very subject to vary when sown two or three Years in the same Place, so there can be no doubt of their being seminal Variations, which are not worth enumerating in this Place.

The *English Sea Pea*, is found wild upon the Shoar in *Suffex*, and several other Counties in *England*; this was first taken Notice of in the Year 1555, between *Orford* and *Aldborough*, where it grew upon the Heath, where nothing, no not Grails, was ever seen to grow, and the poor People being in Distress, by Reason of the Dearth of that Year, gathered large Quantities of these Peas, and so preserved themselves and Families: This is mentioned by *Stow* in his *Chronicle*, and *Camden* in his *Britannia*. But they were both mistaken, in imagining that they were Peas cast on Shoar by a Shipwreck, seeing they grow in divers other Parts of *England*, and are undoubtedly a different Species from the common Pea.

The Sixteenth Sort is greatly cultivated in the Fields in *Dorsetshire*, where they are known by the Name of *Pig Peas*, the Inhabitants making great Use of them to feed their Hogs. These are also often brought up to *London* and sold for the same Purpose.

I shall now proceed to set down the Method of cultivating the several Sorts of Garden Peas, so as to continue them throughout the Season.

It is a common Practice with the Gardeners near *London*, to raise Peas upon Hot-beds, to have them very early in the *Spring*, in order to which, they sow their Peas upon warm Borders under Walls or Hedges, about the Middle of *October*; and when the Plants come up, they draw the Earth up gently to their Stems with a Hoe, the better to protect them from Frost; in these Places they let them remain until the latter End of *January*, or the Beginning of *February*, observing to earth them up from time to time as the Plants advance in Height (for the Reasons before laid down) as also to cover them in very hard Frost with Peas-haulm, Straw, or some other light Covering, to preserve them from being destroy'd, then

at the Time before-mention'd, they make a Hot-bed (in proportion to the Quantity of Peas intended) which must be well work'd in laying the Dung, that the Heat may not be too great: The Dung should be laid about two Feet thick or somewhat more, according as the Beds are made earlier or later in the Season; when the Dung is equally levelled, then the Earth (which should be light and fresh, but not over rich) must be laid on about Six Inches thick, laying it equally all over the Bed: This being done, the Frames (which should be two Feet deep on the Back-side, and about fourteen Inches in Front) must be put on, and cover'd with Glasses, after which it should remain three or four Days, to let the Steam of the Bed pass off, before you put the Plants therein; observing every Day to raise the Glasses either with Bricks or Stones, to give Vent for the rising Steam to pass off; then when you find the Bed of a fine moderate Temperature for Heat, you should with a Trowel, or some other Instrument, take up the Plants as carefully as possible, to preserve a little Earth to their Roots, and plant them into the Hot-bed in Rows, about a Foot asunder, and the Plants should be set about an Inch and Half, or two Inches distance from each other in the Rows; observing to water and shade them until they have taken Root; after which you must be careful to give them Air, at all Times when the Season is favourable; otherwise they will draw up very weak, and be subject to grow mouldy and decay. You should also draw the Earth up to the Shanks of the Plants, as they advance in Height, and keep them always clear from Weeds; the Water they should have, must be given them sparingly, for if they are too much water'd, it will cause them to grow too rank, and sometimes rot off the Plants at their Shanks, just above Ground; when the Weather is very hot, you should cover the Glasses with Mats in the Heat of the Day, to screen them from the Violence of the Sun, which is then too great for them, causing their Leaves to flag, and their Blossoms to fall off without producing Pods; as will also the keeping of the Glasses too close at that Season. But when the Plants begin to fruit, they should be water'd oftener, and in greater Plenty than before; for by that Time the Plants will have nearly done growing, and the often refreshing them will occasion their producing a greater Plenty of Fruit.

The Sort of Pea which is always used for this Purpose, is the Dwarf; for all the other Sorts ramble too much to be kept in Frames: the Reason for sowing them in the common Ground, and afterwards transplanting them on a Hot-bed, is also to check their Growth, and cause them to bear in less Compass; for if the Seeds were sown upon a Hot-bed, and the Plants continued thereon, they would produce such luxuriant Plants as not to be contained in the Frames, and would bear but little Fruit.

The next Sort of Pea, which is sown to succeed those on the Hot-beds, is the *Hot-spur*, of

of which there are reckon'd three or four Sorts, as the *Master's Hot-spur*, the *Reading Hot-spur*, and some others; which are very little differing from each other, except in their early Bearing, for which the *Master's Hot-spur* is chiefly prefer'd; tho' if either of these Sorts are cultivated in the same Place for three or four Years, they are apt to degenerate and be later in Fruiting, for which Reason most curious Persons procure their Seeds annually from some distant Place, and in the Choice of these Seeds, if they could be obtained from a colder Situation, and a poorer Soil, than that in which they are to be sown, it will be much better than on the contrary, and they will come earlier in the *Spring*.

These must also be sown on warm Borders, towards the latter End of *October*, and when the Plants are come up, you should draw the Earth up to their Shanks in the Manner before directed, which should be repeated as the Plants advance in Height (always observing to do it when the Ground is dry) which will greatly protect the Stems of the Plants against Frost; and if the Winter should prove very severe, it will be of great service to the Plants, to cover them with Peas-haulm, or some other light Covering, which should be constantly taken off in mild Weather, and only suffer'd to remain on during the Continuance of the Frost; for if they are kept too close, they will be drawn very weak and tender, and thereby be liable to be destroy'd with the least Inclemency of the Season.

In the *Spring* you must carefully clear them from Weeds, and draw some fresh Earth up to their Stems; but do not raise it too high to the Plants, lest by burying their Leaves you should rot their Stems, as is sometimes the Case, especially in wet Seasons. You should also observe to keep them clear from Vermin, which if permitted to remain amongst the Plants, will increase so plentifully, as to devour the greatest Part of them; the chief of the Vermin which infect *Peas*, are the *Slugs*, which lie all the Day in the small Hollows of the Earth near the Stems of the Plants, and in the Night-time come out and make terrible Destruction of the *Peas*; and these chiefly abound in wet Soils, or where a Garden is neglected and over-run with Weeds; therefore you should make the Ground clear every Way round the *Peas*, to destroy their Harbours, and afterwards in a fine, mild Morning very early, when these Vermin are got abroad from their Holes, you should slack a Quantity of *Lime*, which should be sown hot over the Ground, pretty thick, which will destroy the Vermin, where-ever it happens to fall upon them; but will do very little Injury to the *Peas*, provided it be not scatter'd too thick upon them: This is the best Method I could ever find to destroy these troublesome Vermin.

If this Crop of *Peas* doth hit, it will immediately succeed those on the Hot-bed; but for fear this should miscarry, it will be proper to sow two more Crops, at about a Fortnight distance from each other; so that there may be the more Chances to succeed: This will be

sufficient until the *Spring* of the Year, when you must sow at least two more Crops of these *Peas*; one toward the latter End of *January*, and the other a Fortnight after: these two later Sowings, will be sufficient to continue the early Sort of *Peas* through the first Season, and after this it will be proper to have some of the large Sorts of *Peas* to succeed them; in order to which, you should sow some of the *Spanish Moretto*, which is a great Bearer, and a hardy Sort of *Pea*, about the Middle of *February*, upon a clear open Spot of Ground; these must be sown in Rows, about two Feet and a Half asunder, and the *Peas* should be dropped in the Drills about an Inch and a half distance, covering them about two Inches deep with Earth, being very careful that none of them lie uncovered, which will draw the *Mice*, *Pigeons* or *Rooks* to attack the whole Spot; and it often happens by this Neglect, that a whole Plantation is devour'd by these Creatures; whereas when there are none of the *Peas* left in sight, they do not so easily find them out.

About a Fortnight after this, you should sow another Spot, either of this Sort, or any other large Sort of *Pea* to succeed those, and then continue to repeat sowing once a Fortnight till the Middle or latter End of *April*, some of these Kinds, only observing to allow the *Marrow-fats*, and other very large Sorts of *Peas*, at least three Feet between Row and Row; and the *Rose Pea* should be allowed at least eight or ten Inches distance Plant from Plant, in the Rows; for these grow very large, and if they have not Room allowed them, they will spoil each other, by drawing up very tall, and will produce no Fruit.

When these Plants come up, the Earth should be drawn up to their Shanks (as was before directed) and the Ground kept entirely clear from Weeds; and when the Plants are grown eight or ten Inches high, you should stick some rough Boughs, or brush Wood, into the Ground close to the *Peas*, for them to ramp upon, which will support them from trailing upon the Ground, which is very apt to rot the large growing Sorts of *Peas*, especially in wet Seasons: besides, by thus supporting them, the Air can freely pass between them, which will preserve the Blossoms from falling off before their Time, and occasion them to bear much better, than if permitted to lie upon the Ground; and there will be Room to pass between the Rows to gather the *Peas* when they are ripe.

The Dwarf Sorts of *Peas* may be sown much closer together, than those before-mentioned; for these seldom rise above a Foot high, and rarely spread above half a Foot in width; so that these need not have more Room than two Feet Row from Row, and about an Inch asunder in the Rows. These will produce a good Quantity of *Peas*, provided the Season be not over dry; but they seldom continue long in bearing, so that they are not so proper to sow for the main Crop, when a Quantity of *Peas* is expected for the Table: their chief Excellency being for Hot-

beds,

beds, where they will produce a greater Quantity of *Peas* (provided they are well manag'd) than if expos'd to the open Air, where the Heat of the Sun soon dries them up.

The *Sickle Pea* is much more common in *Holland* than in *England*, it being the Sort mostly cultivated in that Country; but in *England* they are only propagated by curious Gentlemen for their own Table, and are rarely brought into the Markets; this Sort the Birds are very fond of; and if they are not prevented, do many times destroy the whole Crop. This should be planted in Rows, about two Feet and a half asunder, and be managed as hath been directed for the other Sorts.

The *Grey*, and other large Winter *Peas*, are seldom cultivated in Gardens, because they require a great deal of Room; but are usually sown in Fields, in most Parts of *England*. The best Time for sowing of these, is about the Beginning of *March*, when the Weather is pretty dry, for if they are put into the Ground in a very wet Season, they are apt to rot, especially if the Ground be cold; these should be allowed at least three Feet distance Row from Row, and must be sown very thin in the Rows; for if they are sown too thick, the Haulm will spread so as to fill the Ground, and ramble over each other, which will cause the Plants to rot, and prevent their Bearing.

The best Method to sow these *Peas*, is, to draw a Drill with a Hoe by a Line, about two Inches deep, and then scatter the Seeds therein, after which, with a Rake you may draw the Earth over them, whereby they will be equally covered; and this is a very quick Method for Gardens; but where they are sown in Fields, they commonly make a shallow Furrow with the Plough, and scatter the Seeds therein, and then with a Harrow they cover them over again. After this, the great Trouble is to keep them clear from Weeds, and draw the Earth up to the Plants; this, in such Countries where Labour is dear, is a great Expence, to do it by Hand with a Hoe; but this may be easily effected with a Breast-hoeing Plough, which may be drawn through between the Rows, which will entirely eradicate the Weeds, and by stirring of the Soil, render it mellow, and greatly promote the Growth of the Plants.

When any of these Sorts are intended for Seed, there should be as many Rows of them left ungather'd, as may be thought necessary to furnish a sufficient Quantity of Seed; these must remain until their Pods are changed brown, and begin to split; when you should immediately gather them up together with the Haulm, and if you have not Room to stack them up until Winter, you may thrash them out so soon as they are dry, and put them up in Sacks for Use: But you must be very careful not to let them remain too long abroad after they are ripe, for if Wet should happen, it would rot them, and Heat after a Shower of Rain, would cause their Pods to burst and cast forth their Seeds, so that the greatest Part of them would be lost; but, as I said before, it is not adviseable to continue sowing of the

same Seed longer than two Years, for the Reasons there laid down; but rather to exchange your Seeds every Year, or every two Years at least, whereby you may always expect to have them prove well.

PISUM CORDATUM; *vide* Corindum.

PLANTA, a *Plant*, is defin'd by the ingenious Mr. *John Martyn* to be an organical Body, destitute of Sense and spontaneous Motion, adhering to another Body in such a manner, as to draw from it its Nourishment, and having a Power of propagating its self by Seed. As to the Parts of which a *Plant* consists, they are the Root, Stalk, Leaf, Flower and Fruit.

Plant and *Vegetable* are pretty near Terms synonymous, all *Plants* being *Vegetables*. Dr. *Boerhaave* defines a *Vegetable* to be a Body generated of the Earth, or of something arising of the Earth, to which it adheres or is connected by Parts call'd *Roots*, through which it receives the Matter of its Nourishment and Increase; and consists of Juices and Vessels sensibly distinct from each other: or a *Vegetable* is an organical Body, compos'd of Vessels and Juices, every where distinguishable from each other; to which Body grow *Roots* or Parts whereto it adheres, and from which it derives the Matter of its Life and Growth.

This Definition furnishes a just and adequate Idea of a *Vegetable*; for by its consisting of *Vessels and Juices*, it is distinguished from a *Fossil*, and by its adhering to another Body, and deriving its Nourishment therefrom, it is distinguish'd from an *Animal*.

A *Vegetable* is defin'd an *organical Body*, because consisting of different Parts, which jointly concur to the Exercise of the same Function; adhering by some of its Parts to another Body, for we know of no *Plant* that is absolutely vague and fluctuating; but has still a Body it adheres to, though that Body may be various, *e. g.* *Earth*, as in our common *Plants*; *Stone*, as in *Rock Plants*; *Water*, as in *Sea Plants*; and *Air*, as in some *Mucilages*.

As to those few *Plants* which appear to float in the *Water*, their manner of Growth is something anomalous. M. *Tournefort* has shewn, that all *Plants* do not arise strictly from Seeds; but that some instead of *Semen*, deposite, or let fall a little Drop of Juice, which sinking in the *Water*, reaches the Bottom, or some *Rock*, &c. in its way, to which it sticks, strikes Root, and shoots into Branches; such is the Origin of *Coral*. Add, that the Root of a *Plant* may have any Situation at Pleasure, with respect to the Body thereof; nor needs it either be lowest or highest, &c. accordingly in *Aloes*, *Coral*, *Mosses*, *Fungus's*, &c. the Root is frequently uppermost, and its Growth downwards.

The Vessels, or containing Parts of *Plants* consist of mere *Earth*, bound or connected together by Oil, as a *Gluten*, which being exhausted by Fire, Air, Age, or the like, the *Plant* moulders or returns again into its *Earth* or *Dust*: Thus in *Vegetables* burnt by the intensest Fire, the *Earth* or Matter of Vessel

is

is left intire, and undissoluble by its utmost Force; and consequently the Matter thereof is neither Water, nor Air, nor Salt, nor Sulphur, but Earth alone.

The Root or Part whereby Vegetables are connected to their Matrix, and by which they receive their nutritious Juice, consists of an infinite Number of absorbent Vessels, which being dispersed through the Interstices of the Earth, attract or imbibe the Juices of the same, consequently every Thing in the Earth, that is dissoluble in Water, is liable to be imbib'd; as Air, Salt, Oil, Fumes of Minerals, Metal, &c. and of these Plants do really consist.

These Juices are drawn from the Earth very crude; but by the Structure and Fabrick of the Plant, and the various Vessels they are strain'd through, become chang'd, farther elaborated, secreted, and assimilated to the Substance of the Plant.

The Motion of the nutritious Juices of Vegetables is produc'd much like that of Blood in Animals, by the Action of the Air; in effect, there is something equivalent to Respiration throughout the whole Plant.

The Discovery of this we owe to the admirable *Malpighi*, who first observed that Vegetables consist of two Series or Orders of Vessels; first, such as receive and convey the alimential Juices, answering to the Arteries, Lacteals, Veins, &c. of Animals; secondly, *Trachea*, or Air vessels, which are long, hollow Pipes, wherein Air is continually receiv'd and expell'd, i. e. inspir'd and expir'd; within which *Trachea* he shews all the former Series of Vessels are contained.

Hence it follows, that the Heat of a Year, nay, of a Day, of a single Hour or Minute, must have an Effect on the Air included in these *Trachea*, i. e. must rarefy it, and consequently dilate the *Trachea*, whence arises a perpetual Spring or Source of Action to promote the Circulation in Plants.

PLANTAIN TREE; *vide* Mufa.

PLANTING: Although the Method of *Planting* the various Sorts of Trees, is fully set down, under the several Articles where each Kind is mentioned, yet it may not be amiss to say something in general upon that Head in this Place; which shall be set down as briefly as possible. And,

First, The first Thing in the *Planting* of Trees, is to prepare the Ground (according to the different Sorts of Trees you intend to plant) before the Trees are taken out of the Earth; for you should suffer them to remain as little Time out of the Ground as possible.

In taking up the Trees, you should carefully dig away the Earth round their Roots, so as to come at their several Parts to cut them off, for if they are torn out of the Ground without Care, the Roots will be broken and bruised very much, to the great Injury of the Trees. When you have taken them up, the next thing is to prepare them for *Planting*, in doing of which, there are two Things to be prin-

cipally regarded; the one is to prepare the Roots, and the other to prune their Heads, in such a Manner, as may be most serviceable in promoting the future Growth of the Trees.

And first, as to the Roots; all the small Fibres are to be cut off, as near to the Place from whence they are produc'd, as may be (excepting such Trees as are to be replanted, immediately after they are taken up) otherwise the Air will turn all the small Roots and Fibres black; which if permitted to remain on, when the Tree is planted, will grow mouldy and decay, and thereby spoil all the new Fibres which are produced; so that many times the Trees miscarry for want of duly observing this: After the Fibres are all cut off, you should prune off all the bruised or broken Roots smooth, otherwise they are apt to rot and distemper the Trees; you should also cut out all irregular Roots which cross each other, and all downright Roots (especially in Fruit-Trees) must be cut off; so that when the Roots are regularly pruned, they may in some measure resemble the Fingers of a Hand, when spread open; then you should shorten the larger Roots, in proportion to the Age and Strength of the Tree; as also the particular Sorts of Trees, are to be consider'd, for the *Walnut*, *Mulberry*, and some other tender-rooted Kinds should not be pruned so close, as the more hardy Sorts of Fruit or Forest Trees, which in young Fruit Trees, such as *Pears*, *Apples*, *Plums*, *Peaches*, &c. that are one Year old, from budding or grafting, may be left about eight or nine Inches long; but in older Trees, they must be left of a much greater Length; but this is to be understood of the larger Roots only, for the small ones must be chiefly cut quite out, or pruned very short, their extream Parts, which are generally very weak, do commonly decay after moving, so that it is the better Way intirely to displace them.

The next thing is the Pruning of their Heads, which must be differently perform'd in different Trees, and the Design of the Trees, must also be consider'd; for if they are intended for Walls or *Espaliers*, it is the better way to plant them with the greatest Part of their Heads, which should remain on until the *Spring*, that the Trees begin to shoot, when they must be cut down to five or six Eyes (as is fully set down in the several Articles of the various Kinds of Fruit) being very careful in doing of this, not to disturb the new Roots.

But if the Trees are design'd for Standards, you should prune off all the small Branches close to the Places where they are produced, as also irregular Branches which cross each other, and by their Motion when agitated by the Wind, do rub and bruise each other, so as to occasion many times great Wounds in those Places; besides, it makes a disagreeable Appearance to the Sight, and adds to the Closeness of its Head, which should always be avoided in Fruit Trees; whose Branches should be preserved as far distant from each other, as they are usually produced when in a regular way of Growth, (which is in all Sorts

of Trees proportionable to the Size of their Leaves, and Magnitude of their Fruit) for when their Heads are very thick, (which is often occasioned by the unskilful shortening of their Branches) the Sun and Air cannot freely pass between their Leaves, so that the Fruit must be small and ill tasted. But to return; After having displaced these Branches, you should also cut off all such Parts of Branches, as have by any Accident been broken or wounded; for these will remain a disagreeable Sight, and often occasion a Disease in the Tree. But you should, by no means, cut off the main, leading Shoots, as is, by too many, practis'd, for those are necessary to attract the Sap from the Root, and thereby promote the Growth of the Tree: For, from several Experiments which I made the *Winter* 1709, by cutting off the Branches of several Sorts of Trees, and putting them into Phials fill'd with Water, whose Tops were closely cover'd, to prevent the Evaporating of the Water, I found, that those Shoots whose leading Buds were preserved, did attract the Moisture in much greater Quantity, than those Shoots whose Tops were cut off: And from several Experiments made by the Reverend Mr. Hales, we find, that great Quantities of Moisture are imbib'd at Wounds, where Branches are cut off; so that by thus shortening the Branches, the Wet, which generally falls in great Plenty during the *Winter* Season, is plentifully imbib'd, and for want of Leaves to perspire it off, mixes with the Sap of the Trees, and thereby distending the Vessels, destroys their contracting Force, which many times kills the Tree, or at least weakens it so much, as not to be recovered again for some Years; as I have several Times observed.

But being willing to try the Experiment, in the Month of *October* 1723, I made choice of two Standard Almond-Trees, of equal Strength and Age; these I took up as carefully as possible, and having prepar'd their Roots as before directed, I prun'd their Heads in the following manner, *viz.* Of one of them I only cut off the small Branches, and such as were bruise'd or broken, but preserv'd all the strong ones entire: Of the other I shortened all the strong Branches, and prun'd off the weak and broken Shoots, as is the common Practice. These two Trees I planted in the same Soil, and to the same Situation, gave them both equal Attendance, and manag'd them both as nearly alike as possible; yet, in the *Spring*, when these Trees began to shoot, that, whose Branches, were entirely preserv'd, came out early, continued to shoot stronger, and is at present much larger, and in better Health than the other. And since this, I have made several other Experiments of the like Nature, which have constantly succeeded in the same Manner; from whence it is reasonable to conclude, that the shortening of the Branches is a great Injury to all new-planted Trees.

Having thus prepared the Trees for *Planting*, we must next proceed to the Placing them

into the Ground; but before this, I would advise, if the Trees have been long out of the Ground, so that their Fibres are dry'd, to place their Roots in Water eight or ten Hours, before they are *planted*, observing to place them in such a Manner, that their Heads may remain erect, and their Roots only immers'd therein, which will swell the dry'd Vessels of the Roots, and prepare them to imbibe Nourishment from the Earth. In fixing of them, great Regard should be had to the Nature of the Soil, which, if cold and moist, the Trees should be *planted* very shallow; as also, if it be a hard Rock or Gravel, it will be much the better Way to raise a Hill of Earth where each Tree is to be *planted*, than to dig into the Rock or Gravel, and fill it up with Earth, (as is too often practis'd) whereby the Trees are *planted*, as it were, in a Tub, there being but little Room for their Roots to extend; so that after two or three Years Growth, when their Roots have extended to the Sides of the Hole, they are stopp'd by the Rock or Gravel, can get no farther, and the Trees will decline, and, in a few Years, die; besides, these Holes do detain the Moisture so that the Fibres of the *Plants* are often rotted thereby. But when they are raised above the Surface of the Ground, their Roots will extend, and find Nourishment, tho' the Earth upon the Rock or Gravel be not three Inches thick, as may be frequently observed, where Trees are thus placed.

The next thing to be observed is, to place the Tree in the Hole in such Manner, that the Roots may be about the same Depth in the Ground, as they were growing before they were taken up: Then break the Earth fine with a Spade, and scatter it into the Hole, so that it may fall in between every Root, that there may be no Hollowness in the Earth, (but you should by no Means sift or screen the Mould, for Reasons given in the Article of *Firrs*) then having fill'd in the Earth, you should gently tread it close with your Feet; but do not make it too hard, which is a very great Fault, especially if the Ground be strong or wet.

Having thus *planted* the Trees, you should provide a Parcel of Stakes, which should be drove down by the Sides of the Trees, and fastened thereto to support them from being blown down, or displaced by the Wind; and then lay some Mulch upon the Surface of the Ground, about their Roots, to prevent the Earth from drying.

This is to be understood of Standard Trees which cast their Leaves; and as to such as are *planted* against Walls, there is no other Difference in their Management, but only to preserve their Heads entire, and to place their Roots about five or six Inches from the Wall inclining their Heads thereto; which should be fastened to the Wall, to prevent their being displaced by the Wind; and in the *Spring* following, just before they shoot, their Heads should be cut down to five or six Buds, as is fully directed under the several Articles of the different Kinds of Fruit.

As to the Watering of all new *planted* Trees, I should advise it to be done with great Moderation; nothing being more injurious to them than over-watering of 'em; Examples enough of this Kind may have been seen in *St. James's Park*, a few Years past, where there have been many Trees *planted* to make the Rows complete, where the old Trees were decay'd; and notwithstanding the great Care in bringing in a large Quantity of fresh Earth, where each Tree was *planted*, yet very few of them have taken, and those few which are yet alive, have made but poor Progress, nor will they ever be thriving Trees; which is wholly owing to the Abundance of Water given to them, whereby the Fibres are rotted off as soon as they are produced. And how can any Person imagine, that a Tree should thrive, when the Ground in which it is *planted*, is continually floated with Water? For, by an Experiment made by the Reverend Mr. Hales, in placing the Roots of a Dwarf Pear-Tree in Water, the Quantity of Moisture imbibed decreas'd very much daily, because the Sap-Vessels of the Roots, like those of the cut-off Boughs in the same Experiment, were so saturated and clogged with Moisture, by standing in Water, that more of it could not be drawn up. And this Experiment was tried upon a Tree which was full of Leaves, and thereby more capable to discharge a large Quantity of Moisture, than such Trees as are entirely destitute of Leaves; so that it is impossible such Trees can thrive, where the Moisture is too great about their Roots.

The Seasons for *Planting* are various, according to the different Sorts of Trees or the Soil in which they are *planted*: For such Trees whose Leaves fall off in *Winter*, the best time is the Beginning of *October*, provided the Soil be dry; but for a wet Soil, it is better to defer it until the latter End of *February*, or the Beginning of *March*; and for Ever-greens, the Beginning of *April* is, by far, the best Season, though they may be safely remov'd at *Midsummer*, provided they are not to be carried very far; but you should always make Choice of a cloudy, moist Season, if possible, when they will take fresh Root in a few Days. And, on the contrary, when these Trees are removed in *Winter*, during which time they are almost in a State of Rest, they do not take Root until the *Spring* advances, and sets the Sap in Motion, so that many times they die, especially if the *Winter* proves severe.

As to the Preparing the Soil for *Planting*, that must also be done to suit the different Sorts of Trees, some requiring a light Soil, others a strong one, &c. But this is fully set down in the several Articles of Trees, under their proper Heads, to which the Reader is desired to turn; though for Fruit-Trees in general a fresh Soil from a Pasture-Ground, which is neither too light and dry, nor over strong and moist, but rather a gentle, soft, loamy Earth, is to be preferr'd. And if it be for Wall Trees, it will be the better if the Borders are fill'd with this Earth six Feet wide,

but it need not be above eighteen Inches or two Feet deep at most; for when the Borders are made too deep, the Roots of these Trees are enticed downward, which is of bad Consequence to Fruit-Trees, as hath been elsewhere observed. The same also must be observed for Standard Trees, (where fresh Earth is brought to the Places in which they are *planted*) not to make the Holes too deep, but rather let them have the same Quantity of Earth in Width, which is much to be preferr'd.

There are several Persons who direct the Placing of the same Side of the Tree to the South, which, before removing, had that Position, as a material Circumstance to be strictly regarded; but from several Trials which I have made, I could not observe the least Difference in the Growth of those Trees which were so placed, and others which were reversed; so that I conclude it is not of any Consequence to observe this Method.

The Distance which Trees should be *planted* at, must also be proportioned to their several Kinds, and the several Purposes for which they are intended; all which is explain'd under their several Heads; but Fruit-Trees, *planted* either against Walls, or for Espaliers, should be allowed the following Distances. For most Parts of vigorous-shooting Pear-Trees, twenty four Feet; for Apricocks, sixteen Feet; Apples, sixteen Feet; Peaches, Nectarines, Cherries, and Plums, fourteen or sixteen Feet, according to the Goodness of the Soil, or the Height of the Wall. But as these Things are mention'd in their several Articles, it will be needless to repeat any more in this Place.

PLANTING REVERSE: Dr. *Agricola* tells us, That he has made several Experiments on the Branches of Foreign Trees, as well Orange as Laurel, which he perform'd after the Manner following: He first stripp'd the Branches of all the Leaves, then he bent and ty'd them, dress'd them with his noble Mummy, and *planted* them the *reverse* Way; so that nothing was to be seen of all the Branches, but the great Ends, and kept them, during the *Winter*, in his Stove.

He adds, That those who have a mind to raise Trees this Way, which he calls *Monstrous Fruit-Trees*, may raise Apples, Pears, Cherries, Apricocks, Peaches, Mulberries, Walnut-Trees, &c. also Rose-Trees, Gooseberry Bushes, &c. which he directs to do something more at large, as follows:

Take those Branches that are furnished with long Side Branches, or Twigs, and bend the Side-Twigs in the Joints toward the great Branches and tie them together with Bals or Packthread; then dress them with Mummy, either with a Brush only near the Ligature, and here and there on the Joints, or dip them intirely into it: Then having made a deep Hole in the Ground, set the Branches the *reverse* Way, so that nothing but the long End of the Branch appears above Ground, the rest being covered with good, fat, and well-sifted

well-lifted Earth. This being done, the little Branches will take Root in the Joints every where; then the Buds will begin to shoot, so that you may see fifty or sixty more Branches spring up, making an agreeable as well as monstrous Figure.

Mr. Fairchild of Hoxton had begun to put the same into Practice, and he himself gives Directions for performing it as follows:

First, to make Choice of a young Tree of one Shoot, either of *Alder*, *Elm*, or *Willow*, or any other Tree that will take Root easily by Laying, and to bend that Shoot gently down the extreme Part in the Earth, and so to let it remain 'till it has taken Root, so that the Plant then will resemble an Arch, or bent Bow above the Ground.

When this Top End has well struck new Roots, to dig about the first Root, and raise it gently out of the Ground, 'till the Stem inclines to an Upright, and so stake it up, otherwise it will incline to bend.

Then to prune those Roots that are erected in the Air, from the Bruises and Wounds which they receiv'd in being dug up, and do over with a Brush the prun'd Parts with the following Composition, moderately warm.

Take four Ounces of Tallow, four Ounces of Bees-Wax, two Ounces of Rosin, and two Ounces of Turpentine, melted together in a Pipkin.

After this prune off all the Buds or Shoots that are upon the Stem or Plant, and dress the Wound with the same Composition, to prevent any collateral Shootings, that may spoil the Beauty of the Stem.

Besides, Care is to be taken that the new growing Roots of this revers'd Plant be well nourish'd, and therefore that Part of the Shoot, which was the larger, is to be cut away a little below the Earth, that the Stem may be better nourished, and its Roots translated.

PLATANUS, [*πλατάνος* of *πλατάνος*, breadth] The Plane-Tree

The Characters are;

It hath an amentaceous Flower, consisting of several slender Stamina, which are collected into spherical little Balls, and are barren; but the Embryo's of the Fruit, which are produced on separate Parts of the same Tree, are turgid, and do afterwards become large spherical Balls, containing many oblong Seeds, intermix'd with Down.

The Species are;

1. **PLATANUS**; *Orientalis*, *verus*. *Park.* The true Oriental Plane-Tree.

2. **PLATANUS**; *Occidentalis*, aut *Virginienfis*. *Park. Theat.* The Western or Virginian Plane-Tree.

3. **PLATANUS**; *Orientalis*, *Aceris folio*. *L. Cor.* The Maple-leav'd Plane-Tree.

4. **AN PLATANUS**; *Americanus*, *foliis oblongis ex adverso nascentibus*. The Button-Tree; *vulgò*.

The first of these Trees (though the first known Sort in Europe) is less common than the second; which has been introduced since the English settled in Virginia; which

may be, in a great measure, owing to the latter Sort being much easier to propagate than the former; for every Cutting of this, if planted in a moist Soil, just before the Tree begins to shoot, will take Root, and in a few Years make very large Trees; whereas the first is only propagated from Seeds or by Layers.

The third Sort, although by some suppos'd to be a distinct Species from either of the former, yet is no more but a seminal Variety of the first; for I have had many Plants which came up from the Seeds of the first Sort, which ripen'd in the *Physick-Garden*, which do most of them degenerate to this third Sort, which, in the manner of its Leaves, seems to be very different from either, and might reasonably be suppos'd a distinct Sort, by those who have not traced its Original.

The fourth Sort here mention'd was sent from Carolina, by the Name of *Button-Tree*, and by the Account sent with it, seems to be a Sort of *Plane-Tree*, though the Manner of this Tree's growing is very different from any of the other Sorts; but as it hath not produced either Flowers or Fruit in England, so I cannot determine whether it be a true *Plane-Tree* or not.

These Trees delight to grow on a moist, rich Soil, on which they will arrive to a prodigious Size in a few Years, and during the Summer Season do afford a glorious Shade; their Leaves being of a prodigious Size, especially on a good Soil, so that there is scarcely any Tree at present in England, which does afford so good a Shade. But the Backwardness of their coming out in Spring, together with their Leaves fading early in Autumn, has occasioned their not being so generally esteem'd, as otherwise they would be.

The first Sort was brought out of the Levant to Rome, where it was cultivated with much Cost and Industry: The greatest Orators and Statesmen among the Romans, took great Pleasure in their Villa's which were surrounded with *Platanus*; and their Fondness to this Tree became so great, that we frequently read of their irrigating them with Wine instead of Water. *Pliny* affirms, that there is no Tree whatsoever which so well defends us from the Heat of the Sun in Summer, nor that admits it more kindly in Winter, for the Branches being produced at a proportionable Distance, to the Largeness of their Leaves, (which is what holds through all the different Sorts of Trees yet known) so that when the Leaves are fallen in Winter, the Branches growing at a great Distance, do easily admit the Rays of the Sun.

This Tree was afterwards brought to France, where it was cultivated only by Persons of the first Rank; and so much was the Shade of it priz'd, as that if any of the Natives did but put his Head under it, they exacted a Tribute from them.

It is generally suppos'd, that the Introduction of this Tree into England, is owing to the great Lord Chancellor Bacon, who planted

planted a noble Parcel of them at *Verulam*, which were there, very flourishing, a few Years since. But notwithstanding its having been so long in *England*, yet there are but few very large Trees to be seen of it at present; which may, perhaps, be owing to the great Esteem the Persons of the last Age had for the *Lime*, which being much easier to propagate, and of quicker Growth, during the three or four first Years, than the *Plane-Tree*, thereby it became the most common Tree for Planting of Avenues and shady Walks near Habitations in *England*. But since the Defects of that Tree have been more generally discovered, the *Elm* has had the Preference, and is now the most commonly planted for such Purposes.

However, notwithstanding what has been said of the *Plane-Tree*, of its Backwardness in coming out in the *Spring*, and the sudden Decay of its Leaves in *Autumn*, yet, for the goodly Appearance, and great Magnitude to which it will grow, it deserves a Place in large Plantations, or shady Recesses near Habitations, especially if the Plantation be design'd on a moist Soil, or near Rivulets of Water; in which Places this Tree will arrive to a prodigious Magnitude.

We read of one of these Trees which was growing at a *Villa* of the Emperor *Caligula*, whose Trunk was so large, as, when hollow'd, to make a Room, therein capacious enough to entertain ten or twelve Persons at a Repast, and for their Servitors to wait upon them. And there is Mention made of one of these Trees, which was growing in the *Eastern* Country, which was of so great a Magnitude, that *Xerxes* made his Army (which consisted of Seventeen hundred thousand Men) halt, for some Days, to admire the Beauty and Procerity of this Tree; and became so fond of it, as to take his own, his Concubines, and all the great Persons Jewels to cover it; and was so much enamour'd with it, that for some Days, neither the Concern of his Grand Expedition, nor Interest, nor Honour, nor the necessary Motion of his prodigious Army could dissuade him from it: He styl'd it, His Mistress, His Minion, his Goddess; and when he was obliged to part with it, he caused a Figure of it to be stamp'd on a Gold Medal, which he continually wore about him.

And such was the Esteem which the People of *Asia* had for this Tree, that where-ever they erected any sumptuous Buildings, the Portico's, which open'd to the Air, terminated in Groves of these Trees.

The *Eastern Plane-Tree* is propagated either from Seeds or by Layers, the latter of which is generally practis'd in *England*; though the Plants thus rais'd do seldom make so large, strait Trees, as those which are produc'd from Seeds; but it has been generally thought, that the Seeds of this Tree were not productive, because they have not been sown at a proper Season, nor managed in a right Manner; for I have had thousands of the young Plants spring up from the Seeds of a large Tree, which scatter'd upon the Ground in a

moist Place: And I since find, that if these Seeds are sown soon after they are ripe, in a moist shady Situation, they will rise extremely well; and the Plants thus obtain'd, will make a considerable Progress after the second Year, being much hardier, and less liable to lose their Tops in *Winter*, than those which are propagated by Layers. And since the Seeds of this Tree ripen well in *England*, they may be propagated in as great Plenty as any other Forest Tree.

The *Virginian Plane-Tree* will grow extremely well from Cuttings, if they are planted the Beginning of *March* upon a moist Soil; and if they are water'd in dry Weather, will make a prodigious Progress. So that in a few Years from the Planting, they will afford noble Trees for planting of Avenues, and other shady Walks; and their Trunks are perfectly strait, growing nearly of the same Size to a considerable Height, there being the least Difference in the Girth of this Tree, for several Yards upwards, of any other Sort of Tree whatsoever. The Honourable *Paul Dudley, Esq;* in a Letter to the *Royal Society*, mentions one of these Trees, which he observed in *New-England*, whose Girth was nine Yards, and held its Bigness a great Way up; which Tree, when cut down, made twenty-two Cord of Wood. He also says, in the same Letter, That he has propagated many of these Trees by cutting off Sticks of five or six Feet long, and setting them a Foot deep into the Ground in the *Spring* of the Year, when the Season was wet; and that they always thrive best in a moist Soil.

The Leaves of this Sort are larger, and less divided than those of the *Oriental Plane-Tree*; and the Tree grows much faster, and is hardier, and being thus easily propagated, is now the most common in *England*.

The *Maple-leav'd Plane-Tree* hath its Leaves less divided than the first, but more than the second Sort, so that it is a middle Kind, between both; tho', as I before said, it comes originally from the *Eastern* Sort.

This is propagated very easily by Layers, every Twig of which will take Root, if they are but cover'd with Earth; and when transplanted out in a moist Soil, will grow equally fast with the *Virginian* Kind. But whether this will take from Cuttings or not, I cannot say, having never made Trial of it; though from the Readiness of the Branches taking Root, there is little Reason to doubt of it. The best time to transplant these Trees is in *March*; for if they are removed in *Winter*, and the Season should prove very severe, the tender Shoots are often kill'd by the Frost.

PLUMB-TREE; *vide* *Prunus*.

PLUMBAGO; [This Plant is so call'd, because its Leaves are of a Leaden Colour, and because it colours the Hands of those that handle it of a leaden Colour: In like manner, it is call'd *Molydana*, of *μολύδα*, *Lead*: It was also call'd *Dentillaria* by the Antients, because its Root not only

resembles a Tooth, but because it is also good for the Tooth-ach.] Lead-wort.

The Characters are;

The Flower consists of one Leaf, which is shap'd like a Funnel, and cut into several Segments at the Top; out of whose fistulous Flower-cup rises the Pointal, which afterwards becomes one oblong Seed, for the most part sharp-pointed, which ripens in the Flower-cup.

The Species are;

1. PLUMBAGO, *quorundam*. Clus. Hist. Lead-wort, or Tooth-wort.

2. PLUMBAGO; *Americana*, *Beta folio ampliori*. Plum. American Lead-wort, with a broad Beet-leaf.

The first of these Sorts grows about Naples, in Sicily, and the Southern Parts of France, but is hardy enough to endure the Cold of our Climate in the open Ground, provided it be planted in a warm dry Soil. This is propagated by parting of the Roots in the Spring before they shoot: In doing of which, you should be very careful to preserve a Head to each Slip, otherwise they will not grow. They should be planted in a warm Situation, and a dry Soil, about two Feet asunder, and water'd until they take Root; after which they will require no farther Care, but to clear them from Weeds, and support their Branches from being broken by the Wind. They commonly rise about three Feet high, but, unless the Autumn be very favourable, they seldom flower in this Country. The Root of this Plant is sometimes us'd in Medicine.

The second is preserv'd by such as are curious in collecting Exotick Plants. This may be propagated in the same manner as the former, as also from Seeds, which should be sown upon a Hot-bed in the Spring; and when the Plants come up, they may be treated in the manner directed for *Amaranth's*; to which the Reader is desir'd to turn, to avoid Repetition. These Plants must be plac'd in the Stove in Winter, where they may have a moderate Degree of Warmth, and should frequently be refresh'd with Water. The second Year they will produce Flowers in the Autumn, and if the Season be warm, the Seeds will ripen. This Plant grows plentifully in Jamaica and the Caribbee Islands; and from the Name given to it by Dr. Boerhaave, it doth also grow in Ceylon.

POINCIANA; Barbadoes Flower-Fence, or Spanish Carnations.

The Characters are;

The Flower consists of several Leaves, which are plac'd in a circular Order; in the Center of which arises a Number of crooked Stamina; the Pointal which arises from a quinquesid Flower-cup, becomes a long, broad, flat Pod, opening into two Parts, and fill'd with broad, flat, roundish Seeds, each of which is lodg'd in a separate Cell, which are divided by a thin Partition.

We have but one Species of this Plant, which is,

POINCIANA; *flore pulcherrimo*. Tourn. Barbadoes Flower-Fence, with a fair Flower.

This Plant is very common in the Caribbee Islands, where it is planted for a Fence to divide Fields, and is greatly esteem'd for the Beauty of its Flowers, which are produc'd on long Spikes in vast Quantities. The Leaves of this Plant are also us'd instead of Sena, to purge withal.

This was carry'd from Cape Verd Islands to Barbadoes, as is related by Ligon, and hath since been dispers'd through the other Islands. It grows in those Countries to be ten or twelve Feet high, and the Stem is often as large as the Small of a Man's Leg, and the Wood is very hard; from whence it hath obtain'd the Name of *Ebony* in some Places. There are some Varieties of this Tree in the West-Indies, which differ in the Colour of their Flowers; but whether those Variations do not arise from the same Seeds, I can't determine, since the Plant is so tender as to be rarely preserv'd through the Winter in this Climate.

The Seeds of this Plant are annually brought over in Plenty from the West-Indies, which, if sown upon a Hot-bed, will rise very easily: and when the Plants are come up, they should be transplanted into small Pots, and plung'd into a Hot-bed of Tanners-Bark, observing to shade them while they have taken Root; after which you must give them Air in Proportion to the Warmth of the Season, and they must be frequently refresh'd with Water. When the Plants have fill'd the Pots with their Roots, they should be taken out, and plac'd into larger ones, that they may have Room to grow: If Care be taken to water and shift them as often as is necessary, they will grow to be three Feet high the first Season. At Michaelmas the Pots should be plung'd into a fresh Hot-bed of Tanners-Bark, in the Stove, which should be kept to the Anana's Heat, mark'd on Mr. Fowler's Thermometers, and frequently refresh'd with Water, but you must never give them large Quantities, which is very injurious to these Plants at that Season. The Earth which these Plants should be planted in, must be fresh, light, and sandy (but not over rich); in which they will stand the Winter better than if plac'd in a stronger Soil.

With this Management I have rais'd several Plants to be five Feet high; some of which I have preserv'd two or three Years, and have had the Buds of the Flowers appear, but have not as yet been able to bring them to flower; tho' I am in hopes it may be effected, since the Improvements which are made every Year in the keeping of tender Plants, are very considerable.

POKE VIRGINIAN; *vide* Phytolacca.

POLEMONIUM; [This Plant is so call'd of ~~and~~ much, and ~~never~~ alone, because there are many of its Lobes go to the making of one Leaf. It is also call'd Greek Valerian, because it was brought from Greece.] Greek Valerian, or Jacob's Ladder.

The Characters are;

The Flower consists of one Leaf, which is divided deeply into five Parts, and is Wheel-shap'd;

shap'd; the Pointal which rises from the Flower-cup, afterwards becomes a roundish Fruit, divided into three Cells, which are fill'd with oblong Seeds; to which should be added, The Leaves are pinnated.

The Species are;

1. POLEMONIUM; *vulgare, caeruleum*. Tourn. Green Valerian, with a blue Flower.
2. POLEMONIUM; *vulgare, album*. Tourn. Greek Valerian, with a white Flower.
3. POLEMONIUM; *vulgare, flore variegato*. Tourn. Greek Valerian, with a strip'd Flower.
4. POLEMONIUM; *vulgare, foliis eleganter variegatis*. Boerb. Ind. Greek Valerian, with beautiful strip'd Leaves.

The two first Species are very common in many English Gardens, where they are cultivated for the Beauty of their Flowers: They have also been found wild in *Carlton Beck*. and about *Malham Cove* near *Craven*. The Sort with variegated Flowers, as also that with strip'd Leaves, are Varieties which have been obtain'd from the former.

These Plants are easily propagated, by sowing their Seeds in the Spring upon a Bed of light Earth; and when they are come up pretty strong, they should be prick'd out into another Bed of the same light Earth, about three Inches asunder, observing to shade and water them until they have taken Root, after which they will require no farther Care but to keep them clear from Weeds, until *Michaelmas*; at which time they must be transplanted into the Borders of the Flower-Garden, where, being intermix'd with different sorts of Flowers, they will make a beautiful Appearance. These produce their Flowers in May and June; and their Seeds ripen in August.

The variegated kinds are preserv'd by parting of their Roots, because the Plants rais'd from Seeds would be subject to degenerate, and become plain. The best time to part them is about *Michaelmas*, that they may take good Root before the cold Weather prevents them. These should have a fresh light Soil, but if it be too rich, their Roots will rot in Winter, and their Stripes will go off.

POLIUM; [This Plant is so call'd of *poly* hoary, as much as to say, the hoary Herb, because it was the white Poley of the Antients.] Poley-Mountain.

The Characters are;

It hath a labiated Flower, consisting of one Leaf, whose Stamina supplies the Place of the Crest; the Beard (or Under-lip) is divided into five Segments, as the Germander; out of the Flower-cup rises the Pointal, attended, as it were, by four Embryo's, which afterwards become so many Seeds, shut up in the Flower-cup: To these Marks must be added, That the Flowers are collected into a Head upon the Tops of the Stalks and Branches.

The Species are;

1. POLIUM; *Montanum, luteum*. C. B. P. Yellow Mountain Poley.
2. POLIUM; *Montanum, album*. C. B. P. White Poley Mountain.

3. POLIUM; *Lavendula folio*. C. B. P. Poley Mountain, with a Lavender-leaf.

4. POLIUM; *Lavendula folio, angustiori*. C. B. P. Poley Mountain, with a narrower Lavender-leaf.

5. POLIUM; *Pyreniacum, supinum, bedera terrestris folio*. Tourn. Creeping Pyrenian Poley Mountain, with a Ground-Ivy-leaf.

6. POLIUM; *maritimum, erectum, Monspeliacum*. C. B. P. Upright Poley Mountain of Montpellier.

7. POLIUM; *Montanum, luteum, serratis, angustioribus, incanis foliis*. Barrel Yellow Poley Mountain, with narrow hoary serrated Leaves.

There are several other Species of this Plant, which are preserv'd in some curious Botanick Gardens for Variety; but those here mention'd, are what I have observ'd in the English Gardens.

These Plants are all propagated by planting their Cuttings in a Bed of light fresh Earth, during any of the Summer Months, which should be water'd and shaded until they have taken Root; after which they will require no other Culture than to keep them clear from Weeds until *Michaelmas*; when they should be transplanted into a warm Situation, and must have a very dry Soil, otherwise they are subject to decay in Winter, for they are Natives of warm Countries: but if they are plac'd in a dry Rubbish, under the Shelter of a Wall or Pale, they will endure the Cold of our ordinary Winters very well. These Plants produce their Flowers in June and July, but do rarely perfect their Seeds in this Country. Their Flowers have very little Beauty in them, but for their hoary Leaves, and odd Appearance, a few Plants of them may be admitted for Variety. The second Sort is us'd in Medicine.

POLYANTHOS; *vide* Primula Veris.

POLYGALA; [This Plant is so call'd, of *poly* much, and *gala* Milk, because if Cattle are fed in Marshes that produce this Plant, they give a great Quantity of Milk: It is also call'd *Ambervallis*, of *Ambiendis Arvis*, from illustrating the Fields, because the Antients us'd to crown Virgins with the Flowers of this Plant, when they perambulated the Fields, to implore Fertility thereto: It is also call'd *Amarrella*, because it has a bitter Taste.] Milk-wort.

The Characters are;

It hath a Flower consisting of one Leaf, of an anomalous Figure, perforated behind, but divided into two Lips before; the uppermost Lip is divided into two Parts, but the under one is curiously fringed; out of the lower Part of the Flower rises the Pointal, which afterwards becomes a broad Fruit, divided into two Cells, which contain oblong Seeds; the Fruit is generally inclos'd in the Flower-cup, which is compos'd of five Leaves, viz. three small ones, and two larger, which afterwards embrace the Fruit like Wings.

The

The Species are ;

1. POLYGALA ; *major, carulea, Tabern.* Greater blue Milkwort.

2. POLYGALA ; *major, alba, Tabern.* Greater white Milkwort.

3. POLYGALA ; *vulgaris. C. B. P.* Common Milkwort, with a blue Flower.

4. POLYGALA ; *alba, Tabern.* White common Milkwort.

5. POLYGALA ; *Africana frutescens, folio buxi, flore maximo. Oldenl.* Shrubby African Milkwort, with a Box-leaf, and a very large Flower.

The four first Species are found wild in moist Meadows in divers Parts of England, and are never preserv'd in Gardens, except for the Sake of Variety: However, I thought proper to insert them in this Place, to introduce the fifth Sort, which is a beautiful Plant, and is worthy to be preserv'd in all curious Collections of rare Plants.

This is propagated by Seeds, which should be sown upon a moderate Hot-bed in the Spring ; and when the Plants are come up, they should be prick'd into small Pots, fill'd with light rich Earth, and plung'd into another Hot-bed, where they should be shaded until they have taken Root, and often refresh'd with Water ; after which they must have Air given them in Proportion to the Warmth of the Season, and in July they may be remov'd into the open Air, placing them in a warm Situation, where they may be shelter'd from strong Winds, and in dry Weather they must be often refresh'd with Water : In this Place they may remain until October, when the Nights begin to be frosty ; then you should remove them into the Green-house, placing them where they may have the Advantage of the free Air, when the Weather is favourable enough to admit of the Glasses being open'd, for they only require to be protected from Frost : During the Winter Season, they should often be refresh'd with Water, but it should not be given to them in large Quantities, which will injure their Roots: In Summer, they may be expos'd with Myrtles, Geraniums, &c. in a Situation where they are defended from strong Winds ; and as their Roots increase, so the Size of their Pots should be enlarg'd ; but you must be very cautious not to over-pot them, which is injurious to all sorts of Exotick Plants.

The Earth in which these Plants are set, should be rich, fresh, and light, in which they will thrive exceedingly, and continue in Flower most part of the Year, which renders it very valuable, and if the Season proves favourable, the Seeds will ripen very well ; but you must be careful to gather them when ripe, otherwise they will drop off and be lost.

POLYGONATUM ; [so call'd of *πολύ* many, and *πῦν* a Knee, because it has many little Knees, for the Root is very knotty : It is also call'd *Solomon's-Seal*, because the Knots of the Root somewhat resemble a Seal.] Solomon's-Seal.

The Characters are ;

The Flower consists of one Leaf, is tuberosc, and expands at the Top in Shape of a Bell, and

is divided into several Segments ; the Ovary, which is situated in the Center of the Flower, becomes a soft globular Fruit, containing roundish Seeds.

The Species are ;

1. POLYGONATUM ; *latifolium, vulgare. C. B. P.* Common Broad-leav'd Solomon's-Seal.

2. POLYGONATUM ; *latifolium, vulgare, caulis rubentibus. H. L.* Common broad-leav'd Solomon's Seal, with red Stalks.

3. POLYGONATUM ; *latifolium, minus, flore majore. C. B. P.* Lesser broad-leav'd Solomon's-Seal, with a larger Flower.

4. POLYGONATUM ; *latifolium, flore duplici odore. H. R. Par.* Broad-leav'd Solomon's Seal, with a double sweet-smelling Flower.

There are several other Species of this Plant, which are preserv'd in Botanick Gardens for Variety ; but those here mention'd are the principal Sorts cultivated in England.

These Plants are easily propagated by parting of their Roots in the Spring before they begin to shoot, observing always to preserve a Bud to each Off-set: They should be planted in a fresh light Earth, where they will thrive exceedingly ; but if it be over rich, it will destroy their Roots. The first Sort is the most common in England, and is what the College has directed for Medicinal Use.

POLYPODIUM ; of *πολύ* many, and *πῦν* a Foot, q. d. many Feet. This kind of Plant strikes its Roots into every Part that it can lay hold of, whether it be Stone, Earth, or Tree, it is the same thing, especially if it be a Tree of the Oak kind.] Polypody.

The Characters are ;

It is a Capillary Plant, with oblong jagged Leaves, having a middle Rib, which joins them to the Stalks running through each Division.

The Species are ;

1. POLYPODIUM ; *vulgare. C. B. P.* Common Polypody.

2. POLYPODIUM ; *majus serrato folio. Barr. Icon.* Greater Polypody, with a serrated Leaf.

3. POLYPODIUM ; *Cambro-Britannicum, pin-nulis ad margines laciniatis. Raii. Syn.* Welsh Polypody, with lacinated Leaves.

There are several other Species of this Plant, which are preserv'd in some curious Botanick Gardens for Variety ; but as they are rarely cultivated in other Gardens, so it is not worth while to enumerate them in this Place.

The first Sort is that which is us'd in Medicine, and is found growing upon old Walls and shady Banks in divers Parts of England. The second seems to be only a Variety of the first, which differs therefrom in being larger, and having serrated Leaves. The third Sort was brought from Wales, where it grows in great Plenty, and is the most beautiful of all the Sorts. These Plants may be propagated by parting of their Roots in the Spring before they shoot, and should be planted in a very poor moist Soil under the Shade of a Wall, for if they are expos'd to the Sun, they will not thrive: They chiefly delight to grow out of the Joints of Walls, and old Buildings, but are commonly found expos'd to the North.

POME-

POMEGRANATE; *vide* Punica.

POMUM ADAMI; *vide* Aurantium.

POPULAGO: [This Plant is so call'd, of *Populus* the Poplar-Tree, because it grows near Banks and Ditches under the Poplar-Tree.] Marsh-Marygold.

The Characters are;

The Flower consists of several Leaves, which are plac'd circularly, and expand in Form of a Rose, in the Middle of which rises the Pointal, which afterwards becomes a membranaceous Fruit, in which there are several Cells (which are for the most part bent downwards) collect'd into little Heads, and are full of oblong Seeds.

The Species are;

1. POPULAGO; *flore majore*. Tourn. Marsh-Marygold, with a larger Flower.
2. POPULAGO; *flore minore*. Tourn. Marsh-Marygold, with a smaller Flower.
3. POPULAGO; *flore pleno*. Tourn. Marsh-Marygold with a double Flower.

The two first Sorts are very common on boggy and watry Places in divers Parts of England, and are seldom cultivated in Gardens: But the third Sort, which is a Variety from the second, is preserv'd in Gardens for its fine double Flowers.

This Plant is propagated by parting of the Roots in Autumn, and must be planted on a moist Soil; otherwise the Flowers will not be near so fair, nor will the Plants thrive. These are very proper to place in very wet Parts of the Garden, where few other Plants will thrive, and will afford an agreeable Variety during their Season of Flowering, which is from the Middle of April until the latter End of May; so that they are worthy of a Place in every curious Flower-Garden.

POPULUS; the Poplar-Tree.

The Characters are;

The Leaves are broad, and for the most part angular; the Male Trees produce amentaceous Flowers, which have many little Leaves and Apices, but are barren: The Female Trees produce membranaceous Pods, which open into two Parts, containing many Seeds, which have a large Quantity of Down adhering to them, and are collect'd into Spikes.

The Species are;

1. POPULUS; *alba, minoribus foliis*. C.B.P. White Poplar, with smaller Leaves.
2. POPULUS; *alba, majoribus foliis*. C.B.P. White Poplar, with large Leaves, commonly call'd The Abele-Tree.
3. POPULUS; *tremula*. C. B. P. The Trembling Poplar or Aspen-Tree.
4. POPULUS; *nigra*. C.B.P. The Black Poplar-Tree, by some falsly call'd The Cotton-Tree.
5. POPULUS; *alba, folio minore, variegato*. The white Poplar, with strip'd Leaves.

These Trees may be propagated either from Layers or Cuttings, which will readily take Root, as also from Suckers, which the White Poplars send up from their Roots in great Plenty. The best Time for transplanting these Suckers, is in October, when their Leaves be-

gin to decay. These may be plac'd in a Nursery for two or three Years, to get Strength, before they are planted out where they are design'd to remain: But if you intend to propagate them from Cuttings, it is better to defer the doing of that until February; at which time you may plant Truncheons of four or five Feet long, thrusting them about a Foot into the Ground: These will readily take Root, and if the Soil be moist in which they are planted, will arrive to a considerable Bulk in a few Years.

The black Poplar is not so apt to take Root from large Truncheons, therefore 'tis the better Method, to plant Cuttings about a Foot and an half in Length, thrusting them a Foot deep into the Ground: These will take Root very freely, and may be afterwards transplanted where they are to remain. This Sort will grow upon almost any Soil, but will thrive best in moist Places.

I have planted Cuttings of this Tree, which in four Years, have been bigger in the Trunk than a Man's Thigh, and near twenty Feet in Height, and this upon a very indifferent Soil; but in a moist Soil, it is common for these Trees to shoot twelve or fourteen Feet in a Season: So that where a Person hath a mind to make a Shelter in a few Years, there is scarce any Tree so proper for that Purpose as this: But they should not be planted too near the Pleasure-Garden, because the Down which falls from these Trees will make a prodigious Litter.

The White Sorts, as also the Aspen-Tree, do also cause a great Litter in the Spring, when their Down falls off; and their Roots being very apt to produce a large Quantity of Suckers, renders them unfit to be planted near an House or Garden; but when they are interspers'd with other Trees in large Plantations, they afford an agreeable Variety; their Leaves being very white on their Undersides, which when blown with the Wind, are turn'd to Sight.

A considerable Advantage may be obtain'd by planting these Trees upon moist boggy Soils, where few other Trees will thrive: Many such Places there are in England, which do not, at present, bring in much Money to their Owners; whereas if they were planted with these Trees, they would, in a very few Years, over-purchase the Ground, clear of all Expence: But there are many Persons in England, who think nothing, except Corn, worth cultivating: or, if they plant Timber, it must be Oak, Ash, or Elm; and if their Land be not proper for either of these, it is deem'd little worth; whereas if the Nature of the Soils was examin'd, and proper Sorts of Plants adapted to them, there might be very great Advantage made of several large Parcels of Land, which at this time lie neglected.

The Wood of these Trees, especially of the Abele, is very good to lay for Floors, where it will last many Years; and for its exceeding Whiteness, is, by many Persons, prefer'd to Oak; it is also very proper for Wainscoting of Rooms, being less subject to swell or shrink

than most other Sorts of Wood: But for Turnery Ware, there is no Wood equal to this for its exceeding Whiteness, so that *Trays, Bowls,* and many other Utensils are made of it; and the Bellows-makers prefer it for their Use; as do also the Shoemakers, not only for Heels, but also for the Soles of Shoes: It is also very good to make light Carts; and the Poles are very proper to support *Vines, Hops,* &c. and the Lopping will afford good Fuel, which in many Countries is much wanted.

PORRUM [in Greek is call'd *ῥαῖον* of *ῥαῖν* to enkindle, as though a Plant that excites a Warmth in the Body.] Leek.

The Characters are;

The Flower consists of six Petals, and is shap'd, as it were, like a Bell; in the Center arises the Pointal, which afterwards becomes a roundish Fruit, divided into three Cells, which contain roundish Seeds: To these Notes must be added, The Stamina are generally broad, and flat, ending in three Capillaments; of which the middle one is furnish'd with a Chive; the Flowers are also gather'd into almost globular Bunches; the Roots are long, cylindrical, and coated; the Coats ending in plain Leaves.

The Species are;

1. **PORRUM**; *commune capitatum.* C. B. P. The common Leek.

2. **PORRUM**; *sestivum, latifolium.* C. B. P. Broad-leav'd Leek, commonly call'd The London Leek.

There are some other Species of this Plant, which grow wild in the South of France and Spain, but as they are seldom cultivated in Gardens, so I shall forbear to mention them here. The two Sorts here mention'd, are by many Persons affirm'd to be the same, both of them rising from the same Seed; but this is what the Gardeners near London will not believe, for they never sow the Seeds of the latter, if they can procure those of the first Sort, there being a great Difference in the Size of the Head, or principal Part of the Leek; but whether by long cultivating they may not alter, I cannot positively affirm, having never sown the Seeds of the latter Sort above one Year.

These Plants are cultivated by sowing their Seeds in the Spring, in the same manner as was directed for Onions, with which these are commonly sown, the two Sorts of Seeds being mix'd according to the Proportion which is desir'd of either Sort; tho' the most common Method is, to mix an equal Quantity of both, for the Onions will greatly out-grow the Leeks in the Spring; but these being drawn off in July, the Leeks will have time to grow large afterwards, so that there may be a moderate Crop of both Sorts. The Management of Leeks being exactly the same with Onions, I shall not repeat it in this Place, but shall only add, that many Persons do sow their Leeks very thick in Beds in the Spring; and in June, after some of their early Crops are taken off, they dig up the Ground, and plant their Leeks out thereon, in Rows a Foot apart, and six Inches asunder in the Rows, observing to

water them until they have taken Root; after which they will require no farther Culture, but to clear the Ground from Weeds: The Leeks thus planted, will grow to a great Size, provided the Ground be good; and this Method is very proper for such Persons who have little Room.

If you would save the Seeds of this Plant, you should make Choice of some of the largest and best you have, which must remain in the Place where they grew, until February; when they should be transplanted in a Row against a warm Hedge, Pale or Wall, at about eight Inches asunder; and when their Stems advance, they should be supported by a String, to prevent their being broke down, to which they are very liable, especially when in Head, and the closer they are drawn to the Fence, in Autumn, the better the Seeds will ripen; for it sometimes happens, in cold Summers or Autumns, that those which grow in the open Garden, do not perfect their Seeds in this Country, especially if there should be sharp Frosts early in Autumn, which will intirely spoil the Seed.

When it is ripe, (which may be known by the Heads changing brown) you should cut off their Heads with about a Foot or more of the Stalk to each, and tie them in Bundles, three or four Heads in each, and hang them up in a dry Place, where they may remain till Christmas, or after, when you may thrash out the Seeds for Use. The Husk of these Seeds is very tough, which renders it very difficult to get out the Seeds, therefore some Persons who have but a small Quantity, do rub it hard against a rough Tile, which will break the Husks, and get the Seeds out better than most other Methods I have known used.

PORTULACA: Purslane.

The Characters are;

The Flower consists of many Leaves, which expand in Form of a Rose; out of whose Flower-cup (which consists of one Leaf) arises the Pointal, which, together with the Flower-cup, becomes a Fruit for the most part oval, full of small Seeds, and furnish'd with two Shells or Husks at top; of which the outer one, which was the Part of the Flower-cup that was split in two, opens first; and the inner one, which is the Pointal enlarg'd, opens last, doubly and transversely, while the lower Part of the Flower-cup adheres to the Footstalk.

The Species are;

1. **PORTULACA**; *latifolia, seu sativa.* C. B. P. Broad-leav'd or Garden Purslane.

2. **PORTULACA**; *sativa, latifolia, foliis flavis.* Mor. Hist. Broad-leav'd Garden Purslane, with yellow Leaves.

3. **PORTULACA**; *angustifolia, five sylvestris.* C. B. P. Narrow-leav'd or Wild Purslane.

4. **PORTULACA**; *Curassavica, folio copparidis.* Par. Bat. Purslane from Curasso, with a Caper-leaf.

The first Sort here mention'd, is what the Gardeners near London do chiefly cultivate; though the second Sort does very often come up mix'd with the first; but whether it is only

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an accidental Variety arising from the same Seeds, or that the Seeds are promiscuously sav'd, I can't determine: Indeed, there is no other Difference between them, but only the Colour of their Leaves, so that they are both equally good for Use; but the green Sort having a better Appearance, is generally preferred in the Markets.

The wild Sort is not a Native of England, but grows plentifully in many warm Countries; where when it has once obtain'd so as to shed its Seeds, 'tis very difficult to extirpate again. This is seldom us'd; though 'tis not different from the Garden-kind, except in the Smallness of its Leaves.

The fourth Sort is very common in most of the warm Parts of America, where it grows in great Plenty upon the Shores and Rocks near the Sea. This is preserv'd in some curious Gardens for Variety, but is a Plant of no great Beauty.

Purslane is propagated from Seeds, which may be sown upon Beds of light rich Earth during any of the Summer Months; but if you intend to have it early in the Season, it should be sown upon a Hot-bed, for it is too tender to be sown in the open Air before April, and then it must be in a warm Situation. This Seed is very small, so that a little of it will be sufficient to supply a Family. There is no other Culture which this Plant requires, but to keep it clear from Weeds, and in dry Weather to water it twice or three times a Week. In warm Weather this Plant will be fit for Use in six Weeks after sowing; so that, in order to continue a Succession of this Plant, you should sow it at three or four different Seasons, allowing a Fortnight between each Sowing, which will be sufficient to last the whole Season, while it is proper to be eaten; for it being of a very cold Nature, it is unsafe to be eaten, except in the Heat of Summer, in England; for which Reason, it is not to any Purpose to sow it upon a Hot-bed, since it will come early enough for Use in the open Air.

PRIMULA VERIS: [This Plant is so call'd, because it is the first Plant that appears in the Spring.] Primrose.

The Characters are;

The Flower consists of one Leaf; the lower Part of which is tubulose, but the upper Part expands itself flat in Form of a Salver, and is cut into several Segments; from the Flower-cup (which is fistulous) arises the Pointal; which, when the Flower is decay'd, becomes an oblong Fruit or Husk, lying almost conceal'd in the Flower-cup, and opens at the Top, in which is contain'd many roundish Seeds fasten'd to the Placenta.

The Species are;

1. **PRIMULA VERIS; vulgaris.** Park. Common Primrose.

2. **PRIMULA VERIS; Constantinopolitana,** flore albo. Tourn. Primrose of Constantinople, with a white Flower, commonly call'd The Paper White Primrose.

3. **PRIMULA VERIS; Constantinopolitana,** flore dilutè carneo. Tourn. Primrose of Constantinople, with a pale flesh-colour'd Flower.

4. **PRIMULA VERIS; Constantinopolitana,** flore dilutè purpureo. Tourn. Primrose of Constantinople, with a pale purple Flower.

5. **PRIMULA VERIS Constantinopolitana,** flore albi duplici. Primrose of Constantinople, with a double white Flower, commonly call'd The Double Paper-white Primrose.

6. **PRIMULA VERIS; vulgaris,** flore dilutè purpureo. Common Primrose, with a pale-purple Flower.

7. **PRIMULA VERIS; vulgaris flore pleno.** Common Primrose, with a very double Flower.

8. **PRIMULA VERIS; vulgaris,** flore pleno, dilutè rubente. Common Primrose, with a double pale-red Flower.

9. **PRIMULA VERIS; pallido flore,** elatior. Clus. Common Pagils or Cowslips.

10. **PRIMULA VERIS; umbellata,** odorata, pratensis. Great Cowslips or Oxslips.

11. **PRIMULA VERIS; geminato flore.** H. Fyft. Double Cowslip, or Hose in Hose.

12. **PRIMULA VERIS; caulifera,** flore luteo pleno, odorato J. B. Cowslip or Pagil, with a very double Flower.

13. **PRIMULA VERIS; hortensis,** umbellata, caule & flore folioso, coccineo majore. H. L. Garden Primrose or Polyanthus, with a large red Flower.

14. **PRIMULA VERIS; umbellata,** odorata, hortensis, simplicis, varietas ulerrima pro varietate jucundissima coloris multiplicis. Boerb. Ind.

There are a great Variety of the Garden Primroses or Polyanthus's, which are annually produc'd from Seeds; the Flowers of which are so beautifully strip'd, and some of them have a great Number of Flowers upon a Stalk, so that they equal the *Auricula's* in the Beauty of their Flowers; and as they require but little Culture, so they have, in many Gardens, obtain'd the Preference to most other Spring Flowers.

The first Sort of Primrose grows wild in Woods and other shady Places in most Parts of England, from whence their Roots may be easily transplanted into the Garden; where, if they are placed under Hedges, and in shady Walks, they make a beautiful Appearance early in the Spring, when few other Plants are in Flower.

The best time to transplant them is at Michaelmas, that their Roots may have Strength to produce their Flowers early in the Spring. These delight in a strong, rich Soil, but will grow in almost any sort of Earth, provided they have a shady Situation.

The sixth, seventh, and eighth Sorts are Varieties of the first, which have been accidentally produc'd from Seeds: These may be propagated by parting of their Roots at Michaelmas, and must be treated as the common Sort.

The ninth and tenth Sorts, do also grow wild in the Meadows in divers Parts of England, the Roots of which are often transplanted into Gardens; where, if they are intermix'd with other early flowering Plants, they afford an agreeable Variety.

The

The eleventh and twelfth Sorts are Varieties which were produc'd from Seeds of the former ; but the last is, at present, very rare in *England*. These may be propagated by parting their Roots at *Michaelmas*, and should be planted on a strong Soil, and expos'd to the Morning-Sun.

The several Varieties of *Polyanthus's* are produc'd by sowing of Seeds, which should be sav'd from such Flowers as have good Properties, *i. e.* such as have large upright Stems, producing many Flowers upon a Stalk, the Flowers large, beautifully strip'd, and that open flat : From the Seeds of such Flowers, there is room to hope for a great Variety of good Sorts.

These Seeds should be sown in Boxes fill'd with light rich Earth, in *December*, being very careful not to bury the Seed too deep, for if it be only cover'd with light Earth it will be sufficient : These Boxes should be plac'd where they may receive the Benefit of the Morning-Sun until ten of the Clock, but must by no means be expos'd to the Heat of the Day, especially when the Plants begin to appear, for at that time one whole Day's Sun will intirely destroy them : In the *Spring*, if the Season should prove dry, you must often refresh them with Water ; and as the Heat increaseth, so you should remove the Boxes more in the Shade, for the Heat is very injurious to them.

In *May* these Plants will be strong enough to plant out ; at which time you should prepare some shady Borders, which should be made rich ; upon which you must set the Plants about four Inches asunder, observing to water them until they have taken Root ; after which they will require no farther Care but to keep them clear from Weeds, until the latter End of *August* following ; when you should prepare some Borders, which are expos'd to the East, with good light rich Earth, into which you must transplant your *Polyanthus's*, placing them six Inches asunder equally in Rows, observing, if the Season proves dry, to water them until they have taken Root. In these Borders your Plants will flower the succeeding *Spring* ; at which time you must observe to mark such of them which are fine, to preserve, and the rest may be transplanted into Wildernesses, and other shady Places in the Garden ; where, although they are not very valuable Flowers, they will afford an agreeable Variety.

Those which you intend to preserve, may be removed soon after they have done flowering (provided you do not intend to save Seeds from them) and may be then parted and transplanted into a fresh Border of the like rich Earth, allowing them the same Distance as before ; observing also to water them until they have taken Root, after which they will require no farther Care, but only to keep them clear from Weeds ; and the following *Spring* they will produce strong Flowers ; and if the Kinds are good, will be little inferior to a *Shew of Auricula's*.

These Roots should be constantly removed and parted every Year, and the Earth of the

Border changed, otherwise they will degenerate and lose the greatest Part of their Beauty.

If you intend to save Seeds, which is the Method to obtain a great Variety, you must mark such of them, which, as I said before, have good Properties : These should be, if possible, separated from all ordinary Flowers, for if they stand surrounded with plain-colour'd Flowers, they will impregnate each other, whereby the Seeds of the valuable Flowers will not be near so good, as if the Plants had been in a separate Border where no ordinary Flowers grew ; therefore the best Way is to take out the Roots of such as you do not esteem, so soon as the Flowers open, and plant them in another Place, that there may be none left in the Border, but such as you would chuse for Seeds.

The Flowers of these should not be gathered, except such as are produced singly upon Pedicles, leaving all such as grow in large Bunches ; and if the Season should prove dry, you must now and then refresh them with Water, which will cause their Seeds to be larger and in greater Quantity, than if they were intirely neglected. Towards the latter End of *May* the Seed will be ripe, which may be easily known by the Pods changing brown and opening ; so that you should at that Time look over it three times a Week, gathering each time such of it as is ripe, which should be laid upon a Paper to dry, and may then be put up until the Season of sowing.

PRIMROSE-TREE ; *vide* *Onagra*.

PRIVET ; *vide* *Ligustrum*.

PRUNING OF TREES : There is not any Part of Gardening, which is of more general Use than that of *Pruning* ; and yet it is very rare to see Fruit-Trees skilfully manag'd ; almost every Gardener will pretend to be a Master of this Business, though there are but few who rightly understand it ; nor is it to be learn'd by Rote, but requires a strict Observation of the different manners of Growth of the several Sorts of Fruit Trees ; some requiring to be manag'd one way, and others must be treated in a quite different Method, which is only to be known from carefully observing how each Kind is naturally dispos'd to produce its Fruit : For some Sorts do produce their Fruit on the same Year's Wood, as *Vines* ; others produce their Fruit, for the most part, upon the former Year's Wood, as *Peaches*, *Nectarines*, &c. and others upon Cursons or Spurs, which are produced upon Wood of three, four, or five Years old, as *Pears*, *Plumbs*, *Cherries*, &c. therefore in order to the right Management of Fruit-Trees, there should always be Provision made to have a sufficient Quantity of bearing Wood, in every Part of the Trees, and at the same time, there should not be a Superfluity of useless Branches, which would exhaust the Strength of the Trees, and cause them to decay in a few Years.

The

The Reasons which have been laid down for *Pruning* of Fruit-Trees, are as follow; First, to preserve Trees longer in a vigorous bearing State; the second is, to render the Trees more beautiful to the Eye; and thirdly, to cause the Fruit to be larger and better tasted.

1. It preserves a Tree longer in a healthy bearing State, by *Pruning* off all superfluous Branches, whereby there are no more left upon the Tree than is necessary, or that the Roots can nourish kindly; so that the Root is not exhausted in supplying useless Branches, which must afterwards be cut out, and thereby consequently much of the Sap expended to no Purpose.

2. By skilful *Pruning* of a Tree, it is rendered much more pleasing to the Eye; but I would not be understood to be an Advocate for a Sort of *Pruning*, which I have seen too much practis'd of late, *viz.* the drawing of a regular Line against the Wall, according to the Shape or Figure they would reduce the Tree to, and cut all the Branches, whether strong or weak, exactly to the chalk'd Line; the Absurdity of which Practice, will soon appear to every one who will be at the Pains of observing the Difference of those Branches shooting the succeeding *Spring*. All therefore that I mean by rendering a Tree beautiful is, that the Branches are all *prun'd* according to their several Strengths, and are nail'd at equal Distances, in proportion to the different Sizes of their Leaves and Fruit; and that no Part of the Wall (so far as the Trees are advanc'd) be left unfurnished with bearing Wood. A Tree well manag'd, though it does not represent any regular Figure, yet will appear very beautiful to the Sight, when it is thus dress'd and nail'd to the Wall.

3. It is of great Advantage to the Fruit; for the cutting away all useless Branches, and shortening all the bearing Shoots, according to the Strength of the Tree, does render the Tree more capable to nourish those which are left remaining, so that the Fruit will be much larger, and better tasted. And this is the Advantage which those Trees against Walls or Espaliers have, to such as are Standards, and are permitted to grow as they are naturally inclined; for it is not their being trained either to a Wall or Espalier, which renders their Fruit so much better than Standards, but because they have a less Quantity of Branches and Fruit for their Roots to nourish, and so consequently their Fruit will be larger and better tasted.

The Reasons for *Pruning* being thus exhibited, the next Thing is the Method of performing it; but this being fully handled under the several Articles of the different Kinds of Fruit, I shall not repeat it again in this Place, and therefore shall only add some few general Instructions, which are necessary to be understood, in order to the right Management of Fruit-Trees.

There are many Persons who suppose, that if their Fruit-Trees are but kept up to the Wall or Espalier, during the Summer-season, so as not to hang in very great Disorder, and

in *Winter* to get a Gardener to *prune* them, it is sufficient: But this is a very great Mistake; for the greatest Care ought to be employed about them in the *Spring*, when the Trees are in vigorous Growth; which is the only proper Season, to procure a Quantity of good Wood in the different Parts of the Tree, and to displace all useless Branches, so soon as they are produced, whereby the Vigour of the Tree will be intirely distributed to such Branches only, as are design'd to remain, which will render them strong, and more capable to produce good Fruit; whereas, if all the Branches are permitted to remain, which are produced, some of the more vigorous will attract the greatest Share of the Sap from the Tree, whereby they will be too luxuriant for producing Fruit, and the greatest Part of the other Shoots will be starved, and rendered so weak, as not to be able to produce any thing else but Blossoms and Leaves (as hath been before-mentioned) so that it is impossible for a Person, let him be ever so well skill'd in Fruit-Trees, to reduce them into any tolerable Order by *Winter-pruning* only, if they are wholly neglected in the *Spring*.

There are others, who do not intirely neglect their Trees during the *Summer* Season, as those before-mentioned; but yet do little more good to them by what they call *Summer-pruning*; for these Persons neglect their Trees at the proper Season, which is in *May*, when their Shoots are produced, and do only about *Midsummer* go over them, nailing in all their Branches, except such as are produced fore-right from the Wall, which they cut out; and at the same time do often shorten most of the other Branches; all which is intirely wrong Practice; for those Branches which are intended for bearing the succeeding Year, should not be shortened during the Time of their Growth, which will cause them to produce two lateral Shoots from the Eyes below the Place where they were stopp'd, which Shoots will draw much of the Strength from the Buds of the first Shoot, whereby they are often flat, and do not produce their Blossoms, and if those two lateral Shoots are not intirely cut away at the *Winter-pruning*, they will prove injurious to the Tree. And in this Method, suffering those luxuriant Shoots to remain upon the Tree until *Midsummer* before they are displaced, they will exhaust a great Share of the Nourishment from the other Branches (as was before observed) and by shading the Fruit all the *Spring* Season, when they are cut away, and the other Branches fastened to the Wall, the Fruit by being so suddenly exposed, will receive a very great Check, which will cause their Skins to grow tough, and thereby render them less delicate. This is to be chiefly understood of Stone-Fruit and *Grapes*; but *Pears* and *Apples* being much hardier, do not suffer so much, though it is a great Disadvantage to those also to be thus managed.

It must also be remark'd, that *Peaches*, *Nectarines*, *Apricocks*, *Cherries* and *Plums*, are always in the greatest Vigour, when they are the least maim'd by the Knife; for where these

Trees have large Amputations, they are very subject to gum and decay; so that it is certainly the most prudent Method, carefully to rub off all useless Buds when they are first produced, and pinch others, where new Shoots are wanted to supply the Vacancies of the Wall; by which Management Trees may be so ordered, as to want but little of the Knife in *Winter-Pruning*, which is the surest Way to preserve these Trees healthful, and is perform'd with less Trouble than the common Method.

The Management of *Pears* and *Apples*, is much the same with these Trees in *Summer*, but in *Winter* they must be very differently pruned; for as *Peaches* and *Nectarines* do, for the most part, produce their Fruit upon the former Year's Wood, and therefore must have their Branches shortened according to their Strength, in order to produce new Shoots for the succeeding Year; so *Pears* and *Apples*, on the contrary, producing their Fruit upon *Curfons* or *Spurs*, which come out of the Wood of five, six or seven Years old; should not be shortened, because thereby those Buds which were naturally disposed to form these *Curfons* or *Spurs*, would produce Wood Branches, whereby the Trees would be fill'd with Wood, but never produce much Fruit; and as it often happens that the Blossom-Buds are first produced at the Extremity of the last Year's Shoot, so by shortening the Branches, the Blossoms are cut away, which should always be carefully avoided.

There are several Authors who have written on the Subject of *Pruning* in such a prolix Manner, that it is impossible for a Learner to understand their Meaning; these have described the several Sorts of Branches, which are produced on Fruit-Trees; as *Wood-Branches*, *Fruit-Branches*, *Irregular-Branches*, *False-Branches*, and *Luxuriant-Branches*, all which they assert, every Person who pretends to *Pruning*, should distinguish well: Whereas there is nothing more in all this but a parcel of Words to amuse the Reader, without any real Meaning; for all these are comprehended under the Description already given of luxuriant or useless Branches, and such as are term'd useful or Fruit-bearing Branches, and where due Care is taken in the *Spring* of the Year, to displace these useless Branches (as was before directed) there will be no such thing as *irregular*, *false*, or *luxuriant Branches*, at the *Winter-Pruning*; therefore it is to no purpose to amuse People with a Cant of Words, which when fully understood, signify just nothing at all.

But since I have explain'd the different Methods of *Pruning* the several Sorts of Fruits, under their respective Articles, I shall forbear repeating it again in this Place; but shall only give some general Hints for the *Pruning* of Standard Fruit-Trees, and so conclude.

First, you should never shorten the Branches of these Trees, unless it be where they are very luxuriant, and grow irregular on one Side of the Tree, attracting the greatest Part of the Sap of the Tree, whereby the other Parts are unfurnished with Branches, or are rendred very weak; in which Case the Branch should

be shortened down so low, as is necessary, in order to obtain more Branches, to fill up the Hollow of the Tree; but this is only to be understood of *Pears* and *Apples*, which will produce Shoots from Wood of three or four Years old; whereas most Sorts of Stone-Fruit will gum and decay, after such Amputations.

But from hence I would not have it understood, that I would direct the reducing of these Trees into an exact spherical Figure, since there is nothing more detestable, than to see a Tree (which if permitted to grow as it is naturally dispos'd, with its Branches produced at proportionable Distances, according to the Size of the Fruit) by endeavouring to make it exactly regular in its Head, so crowded with small weak Branches, as to prevent the Air from passing between them; which will render it incapable to produce Fruit; all that I intend by this stopping of luxuriant Branches, is only when one or two such happen on a young Tree, where they intirely draw all the Sap from the weaker Branches and starve them; and then it is proper to use this Method, which should be done in time, before they have exhausted the Roots too much.

Whenever this happens to Stone-Fruit, which suffer much more by cutting than the former Sorts, it should be remedied by stopping or pinching those Shoots in the *Spring*, before they have obtained too much Vigour; which will cause them to push out Side-branches, whereby the Sap will be diverted from ascending too fast to the leading Branch; (as hath been directed for Wall-Trees) but this must be done with Caution, as before.

You must also cut out all dead or decaying Branches, which cause their Heads to look very ragged, especially at the Time when the Leaves are upon the Tree, these being destitute of them, have but a despicable Appearance; besides, these do attract noxious Particles from the Air, which are injurious to the Trees; therefore the sooner they are cut out, the better; in doing of this, you should observe to cut them close down to the Place where they were produced, otherwise that Part of the Branch left will decay and prove equally hurtful to the Tree, for it seldom happens that when a Branch begins to decay, that it does not die quite down to the Place where it was produced, and if permitted to remain long uncut, does often infect some of the other Parts of the Tree. If the Branches are large which you cut off, it will be very proper, after having smoothed the cut Part exactly even with a Knife, Chissel or Hatchet, to put on a Plaister of grafting Clay, which will prevent the Wet from soaking into the Tree, at the wounded Part.

All such Branches which run cross each other, should also be cut out; for these not only occasion a Confusion in the Head of the Tree, but by lying over each other, do rub off their Bark by their Motion, and very often occasion them to canker, to the great Injury of the Tree; and on old Trees (especially *Apples*) there are often young vigorous Shoots produced from the old Branches near the

the Trunk, which grow upright into the Head of the Trees; these therefore should carefully be cut out every Year, lest by being permitted to grow, they fill the Tree too full of Wood, which should always be guarded against, since it is impossible for such Trees to produce so much, or so good Fruit, as those Trees, whose Branches grow at a farther Distance, whereby the Sun and Air do freely pass between them, in every Part of the Tree.

These are all the general Directions which are proper to be given in this Place, since not only the particular Methods, but also the proper Seasons for *Pruning* all the different Kinds of Fruit, are fully exhibited under their several Articles.

PRUNUS. The Plum-Tree.

The Characters are;

The Flower consists of five Leaves, which are placed in a circular Order, and expand in form of a Rose; from whose Flower-cup rises the Pointal, which afterwards becomes an oval or globular Fruit, having a soft fleshy Pulp, surrounding a hard oblong Stone, for the most part pointed; to which should be added, The Foot-stalks are long and slender, and have but a single Fruit upon each.

The Species are;

1. PRUNUS; *fructu parvo præcoci*. Tourn. The Jean-hative, or White Primordian. This is a small white Plum, of a clear yellow Colour, cover'd over with a white Flew, which easily wipes off; it is a pretty good Bearer, and for its coming very early, deserves a Place in every good Garden of Fruit. This ripens the Beginning of July.

2. PRUNUS; *fructu magno, crasso subacido*. Tourn. Damas noir native, i. e. The early black Damask, commonly call'd The Morocco Plum. This is a pretty large Plum of a round Shape, divided with a Furrow in the Middle (like Peaches) the Out-side is of a dark, black Colour, covered with a light violet Bloom, the Flesh is yellow, and parts from the Stone. It ripens in the Middle of July.

3. PRUNUS; *fructu parvo, dulciatro-ceruleo*. Tourn. The little black Damask Plum. This is a small black Plum, cover'd over with a violet Bloom; the Juice is richly sugar'd, the Flesh parts from the Stone, and it is a good Bearer. Ripe the Middle of July.

4. PRUNUS; *fructu magno, dulci, atro-ceruleo*. Tourn. Gros. Damas Violet de Tours, i. e. Great Damask Violet of Tours. This is a pretty large Plum, inclining to an oval Shape, the Out-side is of a dark Blue, cover'd with a violet Bloom; the Juice is richly sugar'd, and the Flesh parts from the Stone. Ripe the Middle of July.

5. PRUNUS; *fructu rotundo atro-rubente*. The Orleans Plum. This Fruit is so well known to almost every Person, that it is needless to describe it; it is a very plentiful Bearer, which has occasion'd its being so generally planted by those Persons who supply the Markets with Fruit; but it is an indifferent Plum.

6. PRUNUS; *fructu oblongo, atro-rubente*. The Fotheringham Plum. This Fruit is somewhat long, deeply furrow'd in the Middle; the Flesh is firm, and parts from the Stone; the Juice is very rich. This ripens about the Middle of July.

7. PRUNUS; *fructu nigro, carne dura*. Tourn. The Perdrigon Plum. This is a middle-siz'd Plum, of an oval Shape, the Out-side is of a very dark Colour, cover'd over with a violet Bloom; the Flesh is firm and full of an excellent rich Juice; this is greatly esteem'd by the Curious. Ripe the latter End of July.

8. PRUNUS; *fructu magno, è violaceo rubente, suavissimo saccharato*. Tourn. The Violet Perdrigon Plum. This is a large Fruit rather round than long, of a blueish-red Colour on the Out-side; the Flesh is of a yellowish Colour, pretty firm, and closely adheres to the Stone; the Juice is of an exquisite rich Flavour. This ripens the End of July.

9. PRUNUS; *fructu ovato, ex albo flavescente*. The white Perdrigon Plum. This is a middling Plum, of an oblong Figure, the Out-side is yellow covered with a white Bloom, the Flesh is firm and well tasted, it is a very good Fruit to eat raw, or for Sweet-meats, having an agreeable Sweetness mix'd with an Acidity.

10. PRUNUS; *fructu ovato, magno rubente*. Tourn. The Red Imperial Plum, sometimes called The Red Bonum Magnum. This is a large oval-shap'd Fruit, of a deep red Colour, covered with a fine Bloom; the Flesh is very dry, and very indifferent to be eaten raw; but is excellent for making Sweet-meats: This is a great Bearer. Ripe the End of July.

11. PRUNUS; *fructu ovato, magno flavescente*. Tourn. White Imperial, Bonum Magnum; white Holland or Mogul Plum. This is a large oval-shap'd Fruit, of a yellowish Colour, powdered over with a white Bloom; the Flesh is firm, and adheres closely to the Stone; the Juice is of an acid Taste, which renders it unpleasant to be eaten raw; but it is very good for Baking or Sweet-meats: It is a great Bearer, and is ripe towards the End of August.

12. PRUNUS; *fructu ovato ceruleo*. The Cheston Plum. This is a middle-siz'd Fruit, of an oval Figure, the Out-side is of a dark Blue, powder'd over with a violet Bloom; the Juice is rich, and it is a great Bearer. Ripe the End of July.

13. PRUNUS; *fructu maximo, rotundo flavo & dulci*. Tourn. Prune d'Abricot, i. e. The Apricock Plum. This is a large round Fruit of a yellow Colour on the Out-side, powder'd over with a white Bloom; the Flesh is firm and dry, of a sweet Taste, and comes clean from the Stone. This ripens the End of July.

14. PRUNUS; *fructu subrotundo, ex rubro & flavo mixto*. The Maitre Claud. This is a middle-siz'd Fruit, rather round than long, of a fine mix'd Colour, between Red and Yellow; the Flesh is firm, and parts from the Stone, and has a delicate Flavour. Ripe the End of July.

15. PRUNUS;

15. PRUNUS; *fructu rubente dulcissimo*. Tourn. La Roche-Courbon, or Diapree rouge, i. e. the Red Diaper Plum. This is a large round Fruit, of a reddish Colour, powder'd over with a violet Bloom; the Flesh adheres closely to the Stone, and is of a very high Flavour; ripe in the Beginning of August.

16. PRUNUS; *fructu rotundo, flavescente*. La Reine Claude, i. e. Queen Claudia. This is a small round Fruit, of a yellowish Colour, powder'd over with a pearl-colour'd Bloom; the Flesh is firm and thick, quits the Stone, and its Juice is richly sugar'd; ripe the Middle of August.

17. PRUNUS; *fructu rotundo, nigro-purpureo, majori dulci*. Tourn. Myrabolan Plum. This is a middle-siz'd Fruit, of a round Shape, the Outside is a dark Purple, powder'd over with a violet Bloom; the Juice is very sweet; it is ripe the Middle of August.

18. PRUNUS; *fructu rotundo & viridi flavescente, carne dura suavissimo*. The Green Gage Plum. This is one of the best Plums in England; it is of a middle Size, round, and of a yellowish-green Colour on the Outside; the Flesh is firm, of a deep green Colour, and parts from the Stone; the Juice has an exceeding rich Flavour; and it's a great Bearer; ripe the End of July. This is called *Gros Damas Verd*, i. e. the Great Green Damask, in France.

18. PRUNUS; *fructu Amygdalino*. Tourn. Rognon de Coq; i. e. Cock's Testicles. This is an oblong Fruit, deeply furrowed in the Middle, so as to resemble the Testicles; it is of a whitish Colour on the Outside, streak'd with red; the Flesh of it adheres firmly to the Stone, and it is late ripe.

19. PRUNUS; *fructu rotundo flavo dulcissimo*. Drap d'Or, i. e. the Cloth of Gold Plum. This is a middle-siz'd Fruit, of a bright yellow Colour, spotted or streak'd with red on the Outside; the Flesh is yellow, and full of an excellent Juice; it is a plentiful Bearer, and ripens about the End of July.

20. PRUNUS; *fructu cerei coloris*. Tourn. Prune de Sainte Catherine, i. e. St. Catharine Plum. This is a large oval-shap'd Fruit, somewhat flat; the Outside is of an Amber Colour, powder'd over with a whitish Bloom, but the Flesh is of a bright yellow Colour, is dry and firm, adheres closely to the Stone, and has a very agreeable sweet Taste. This ripens at the End of August, and is very subject to dry upon the Tree, when the Autumn proves warm and dry. This makes fine Sweetmeats; and is a plentiful Bearer.

21. PRUNUS; *fructu ovato rubente dulci*. The Royal Plum. This is a large Fruit of an oval Shape, drawing to a Point next the Stalk; the Outside is of a light-red Colour, powder'd over with a whitish Bloom; the Flesh adheres to the Stone, and has a fine sugary Juice. This ripens the End of July.

22. PRUNUS; *fructu parvo ex viridi flavescente*. Tourn. La Mirabelle. This is a small, round Fruit, of a greenish Yellow on the Outside; the Flesh parts from the Stone, is of a bright yellow Colour, and has a fine

sugary Juice. This is a great Bearer, and ripens the Beginning of August.

23. PRUNUS; *Brignonienjis, fructu suavissimo*. Tourn. Prune de Brignole, i. e. the Brignole Plum. This is a large, oval-shap'd Fruit, of a yellowish Colour, mix'd with red on the Outside; the Flesh is of a bright yellow Colour, is dry, and of an excellent rich Flavour. This ripens the Middle of August, and is esteem'd the best Plum for Sweetmeats yet known.

24. PRUNUS; *fructu magno, & violaceo rubente, serotino*. Tourn. Imperatrice, i. e. the Empress. This is a large, round Fruit, of a violet-red Colour, very much powder'd with a whitish Bloom; the Flesh is yellow, cleaves to the Stone, and is of an agreeable Flavour. This ripens about the Middle of September.

25. PRUNUS; *fructu ovato, maximo, flavo*. Tourn. Prune de Monsieur, i. e. the Monsieur Plum. This is sometimes called the *Wentworth* Plum. It is a large, oval-shap'd Fruit, of a yellow Colour both within and without, very much resembling the *Bonum Magnum*; but the Flesh of this parts from the Stone, which the other doth not. This ripens towards the latter End of August, and is very good to preserve, but the Juice is too sharp to be eaten raw; it is a great Bearer.

26. PRUNUS; *fructu majori rotundo, rubro*. Tourn. Prune Cerizette, i. e. the Cherry Plum. This Fruit is commonly about the Size of the *Ox-heart Cherry*, is round, and of a red Colour; the Stalk is long, like that of a Cherry, which this Fruit so much resembles, as not to be distinguished therefrom at some Distance. The Blossoms of this Tree come out very early in the Spring, and being tender, are very often destroy'd by Cold; but it affords a very agreeable Prospect in the Spring; for these Trees are generally cover'd with Flowers, which open about the same time as the Almonds, so that when they are intermix'd therewith, they make a beautiful Appearance before many other Sorts do put out: But where the Fruit is desired they should have a South-East Wall.

27. PRUNUS; *fructu albo, oblongiusculo, acido*. Tourn. The white Pear Plum. This is a good Fruit for Preserving, but is very unpleasant if eaten raw; it is very late ripe, and seldom planted in Gardens, unless for Stocks to bud some tender Sorts of *Peaches* upon, for which Purpose it is esteem'd the best amongst all the Sorts of Plums.

28. PRUNUS; *Mytellinum*. Park. The Muscle Plum. This is an oblong, flat Plum, of a dark-red Colour; the Stone is large, and the Flesh but very thin, and not well tasted, so that its chief Use is for Stocks, as the former.

29. PRUNUS; *fructu parvo violaceo*. The St. Julian Plum. This is a small Fruit, of a dark, Violet Colour, powder'd over with a mealy Bloom; the Flesh adheres closely to the Stone, and in a fine Autumn will dry upon the Tree. The chief Use of this Plum is for Stocks, to bud the more generous Kinds of Plums and Peaches upon, as also for the

Bruxelles

Bruxelles Apricock, which will not thrive so well upon any other Stock.

30. PRUNUS; *sylvestris*, major. J. B. The Black Bullace-Tree. This grows wild in the Hedges in divers Parts of England, and is rarely cultivated in Gardens.

31. PRUNUS; *sylvestris*, *fructu majore albo*. Raii Syn. The White Bullace-Tree. This grows wild, as the former, and is seldom cultivated in Gardens.

32. PRUNUS; *sylvestris*. Ger. Emac. The Black-thorn, or Sloe-Tree. This is very common in the Hedges almost every where; the chief Use of this Tree is to plant for Hedges, as *White-thorn*, &c. and being of quick Growth, is very proper for that Purpose.

All the Sorts of *Plums* are propagated by budding or grafting them upon Stocks of the *Muscle*, *White Pear*, *St. Julian*, *Bonum Magnum*, or any other Sorts of free-shooting *Plums*; the Manner of Raising these Stocks hath been already exhibited under the Article of *Nurseries*, therefore need not be repeated again in this Place; but I would observe, that Budding is much preferable to Grafting, for these Sorts of Fruit-Trees, which are very apt to gum, where-ever there are large Wounds made on them.

The Trees should not be more than one Year's Growth from the Bud, when they are transplanted, for if they are older, they seldom succeed so well, being very subject to canker; or if they do take well to the Ground, commonly produce only two or three luxuriant Branches; therefore it is much more advisable to chuse young Plants.

The Manner of preparing the Ground (if for Walls) is the same as for *Peaches*, as is also the pruning the Roots and planting; and therefore I shall forbear repeating it again. The Distance which these Trees should be planted at, must not be less than fourteen or sixteen Feet, and if the Wall is low, they should be placed eighteen Feet asunder.

Plums should have a middling Soil, neither too wet and heavy, nor over light and dry; in either of which Extrems they seldom do well: And those Sorts which are planted against Walls, should be placed to an East or South East Aspect, which is more kindly to these Fruits than a full South Aspect, on which they are subject to shrivel, and be very dry, and many Sorts will be extream mealy, if expos'd too much to the Heat of the Sun; but most Sorts will ripen extreamly well on *Espaliers*, if rightly manag'd.

There are some Persons who plant *Plums* for Standards, in which Method some of the ordinary Sorts will bear very well; but then the Fruit will not be near so fair as those produced on *Espaliers*, and will be more in danger of being bruised or blown down by strong Winds. The Distance of placing them for *Espaliers* must be the same as against Walls, as must also their Pruning and Management, so that whatever may be hereafter mention'd for one, should be also understood for both.

Plums do not only produce their Fruit upon the last Year's Wood, but also upon Curls

or Spurs, which come out of Wood that is two or three Years old; so that there is not a Necessity of shortening the Branches, in order to obtain new Shoots annually; in every Part of the Tree, (as in *Peaches*, *Nectarines*, &c. hath been directed) since the more these Trees are pruned, the more luxuriant they grow, until the Strength of them are exhausted, and then they gum and spoil: Therefore the safest Method to manage these Trees, is, to lay in their Shoots horizontally, as they are produced, at equal Distances, in proportion to the Length of their Leaves; and where there is not a sufficient Quantity of Branches to fill up the Vacancies of the Tree, there the Shoots may be pinch'd the Beginning of May, (in the Manner as hath been directed for *Peaches*, &c.) which will cause them to produce some lateral Branches to supply those Places; and during the growing Season, all foreright Shoots should be displaced, and such as are to remain must be regularly train'd in to the Wall or *Espalier*, which will not only render them beautiful, but also give to each an equal Advantage of Sun and Air: And hereby the Fruit will be always kept in a ductile, growing State, which they seldom are, when over-shaded with Shoots some Part of the Season, and then suddenly expos'd to the Air, by the taking off or training those Branches in their proper Position.

With thus carefully going over these Trees in the growing Season, there will be but little Occasion for cutting them in *Winter Pruning*, which (as I before have said) is of ill Consequence to all Sorts of Stone-Fruit: Besides, many of these Fruits do produce Blossom-buds, at the Extremity of their former Year's Shoots; so that when those are shortened, the Fruit is cut away, and hereby the Number of Shoots is increased: For whenever a Branch is shortened, there is commonly two or more Shoots produced from the Eyes immediately below the Cut; so that by thus unskilfully Pruning, many Persons crowd their Trees with Branches, and thereby render what little Fruit the Trees do produce, very small and ill-tasted, which is very commonly found in too many Gardens, where the Manager, perhaps, thinks himself a complete Master of his Business. For nothing is more common, than to see every Branch of a Fruit-Tree pass the Discipline of the Knife, however agreeable it be to the several Sorts of Fruits.

Those few Rules before laid down, will be sufficient, if due Observation be join'd therewith, to instruct any Person in the right Management of these Sorts of Fruit-Trees, therefore I shall not say any more on that Subject, lest, by multiplying Instructions, it may render it more obscure to a Learner.

PSEUDOACACIA, [of *ἰσὺς*, false, and *Acacia*.] Virginian Acacia, *vulgô*.

The Characters are;

It hath a papilionaceous Flower, from whose Flower-cup rises the Pointal, wrapped up in a fimbriated Membrane, which afterwards be-

comes a Pod, opening into two Parts, in which are contained several kidney-shap'd Seeds.

The Species are ;

1. PSEUDOACACIA ; *vulgaris*. Tourn. Common Virginian Acacia.

2. PSEUDOACACIA ; *Americana, latifolia, flore roseo*. Plum.

The first of these Trees is very common in England, especially in the Gardens near London, where are several very large old Trees, which have been several Years standing : But the second Sort is, at present, very rare in England.

These Trees may be propagated by sowing their Seeds in the Spring, upon a Bed of light fresh Earth, and when the Plants are come up they should be carefully clear'd from Weeds, and in very dry Weather, if they be refresh'd with Water, it will greatly promote their Growth ; in this Bed the Plants should remain 'till the latter End of March following, at which time they should be transplanted out into a Nursery, in Rows, three Feet asunder, and the Plants eighteen Inches Distance in the Rows, observing to lay a little Mulch upon the Surface of the Ground about their Roots, to prevent the Earth's drying too fast : During the Summer Season you should carefully clear 'em from Weeds, and if they produce irregular Branches, they should be prun'd off, while young. The Spring following the Ground between the Rows should be carefully dug, that the Roots of the Trees may the more easily extend themselves every Way ; and in Summer, the Weeds should be constantly hoed down, to prevent their injuring the Plants.

When the Trees have remain'd in this Nursery three Years, they should be transplanted where they are design'd to grow ; for if they are permitted to remain in the Nursery too long, they will not bear transplanting, their Roots creeping very far just under the Surface of the Earth, which, when too much cut, do seldom abide long in Vigour.

These Trees are very hardy, in respect to Cold, but they will not endure to be exposed too much to strong Winds, which continually break their brittle Branches, and render 'em unsightly ; so that many People have neglected to cultivate these Trees on that Account ; but when they are intermix'd with other large growing Trees, in great Wildernesses, they make a beautiful Variety, and in June they are covered with large Bunches of sweet-smelling Flowers.

Indeed, I can't recommend them for planting Avenues, which was the great Use they were formerly applied to, since in such Places they would be greatly exposed to the Wind, which would cause them to have a ragged Appearance, by the continual snapping of their Branches : Nor are they very proper to plant in Gardens, because their Roots do extend to a great Distance, and emaciate the Soil ; and the Numbers of Suckers, which they are apt to produce, render them very troublesome in open Gardens ; but for large Wildernesses, they are very proper ; where,

if the Soil be moist, they will grow to a considerable Magnitude.

I have seen some of these Trees upwards of forty Feet high, which have divided at a little Distance from the Ground, into three or four Branches, each of which have been equal to a large Tree ; so that it should not be planted too near other Trees, lest, by its great Growth, it over-shadows and destroys them. In many Gardens near London, these Trees have produced good Seeds, from whence a great Number of Plants have been rais'd.

PSEUDO-DICTAMNUS, [of $\Psi\delta\mu\alpha$, false, and dictamnus, Dittany.] Bastard-Dittany.

The Characters are ;

It hath a labiated Flower consisting of one Leaf, whose Upper-lip or Helmet is arched, and generally cut into two Segments ; but the Under-lip (or Beard) is divided into three Parts. Out of the Funnel-shap'd Flower-cup rises the Pointal, attended by four Embryo's, which afterwards become so many oblong Seeds, enclos'd in the Flower-cup.

The Species are ;

1. PSEUDO-DICTAMNUS ; *acetabulis Molluccæ*. C. B. P. Bastard-Dittany, with the Pan or Hollow of Mollucca Balm.

2. PSEUDO-DICTAMNUS ; *Hispanicus, scrophulariæ folio*. Tourn. Spanish Bastard-Dittany, with a Figwort Leaf.

3. PSEUDO-DICTAMNUS ; *Hispanicus, amplifolius, candicans & villosus*. Tourn. Spanish Bastard-Dittany, with a large, hoary, and hairy Leaf.

4. PSEUDO-DICTAMNUS ; *verticillatus, inodorus*. C. B. P. Whorled Bastard-Dittany without Smell.

5. PSEUDO-DICTAMNUS ; *Orientalis, foliis circinatis*. T. Cor. Eastern Bastard-Dittany, with round Leaves.

There are several other Varieties of this Plant, which are preserved in Botanick Gardens, but as they have little Beauty or Use, so it will be needless to enumerate them in this Place.

All these Plants may be propagated by Seeds, parting of their Roots, or Cuttings ; but the two last being the most expeditious Methods, are generally practis'd. The best time to transplant and part their Roots is in the Spring, before they begin to grow, that the Off-sets may take Root before the dry Weather. These should be planted in a poor, dry Soil, where they will endure the Cold much better than if planted in a richer Ground. There is no great Beauty in these Plants, but as they are sometimes preserved by curious Persons, I thought it proper to mention them in this Place.

PSYLLIUM, [takes its Name of $\Psi\psi\lambda\lambda\alpha$, a Flea, because its Seed resembles a Flea, in Shape and Colour.] Fleawort.

The Characters are ;

This Plant agrees with Plantain and Buckhorn Plantain in every respect, excepting that this rises up with leafy Stalks, and divides into many Branches ; whereas both the others produce their Flowers upon naked Pedicles.

The

The Species are :

1. PSYLLIUM ; *majus, erectum*. C. B. P. Greater upright Fleawort.

2. PSYLLIUM ; *majus, supinum*. C. B. P. Greater Fleawort, whose Branches spread to the Ground.

3. PSYLLIUM ; *Indicum, foliis crenatis*. J. B. Indian Fleawort, with notch'd Leaves.

There are several other Varieties of these Plants, distinguished by Writers in Botany ; but since they are of little Use or Beauty, I shall pass 'em by without naming.

These Plants may be propagated by sowing of their Seeds in the Spring, on a Bed of light Earth, and when they are come up they should be clear'd from Weeds, pulling out at the same time some of the Plants, where they stand too close, leaving the remaining ones about eight or nine Inches asunder ; after which they will require no farther Care, but to clear 'em from Weeds ; and in June they will flower, and their Seeds will ripen in Autumn.

The second Sort will abide two or three Years, provided they are on a poor, dry Soil ; but the other two Sorts perish every Year.

The first Sort, which is the most common, is used in Medicine ; but the other two are never used in England.

PTARMICA, [takes its Name of *σάπυς*, sneezing Powder, because the Head of this Plant, being powdered, is used for Snuff ; it is also call'd *Dracunculus*, because it has much the same Figure as *Dracunculus Hortensis*.] Sneezwort.

The Characters are ;

It hath radiated Flowers, whose Disk consists of many Florets, but the Borders are compos'd of Half-Florets ; the Embryo's are lodg'd in the Flower-cup, which is scaly, each of which becomes one slender Seed.

The Species are ;

1. PTARMICA ; *vulgaris, folio longo, serrato, flore albo*. J. B. Common Sneezwort, with a long serrated Leaf, and a white Flower.

2. PTARMICA ; *vulgaris, flore pleno*. Clus. Hist. Common Sneezwort, with a double Flower, by some call'd Double Pellitory.

3. PTARMICA ; *foliis profundè serratis, latè viridibus, elatior*. H. L. Taller Sneezwort, with broad green Leaves deeply serrated.

4. PTARMICA ; *Alpina, incanis, serratis, foliis*. H. L. Alpine Sneezwort, with hoary serrated Leaves.

5. PTARMICA ; *incana, pinnulis cristatis*. T. Cor. Hoary Sneezwort, with crested Leaves.

The first of these Plants is very common upon Heaths and in shady Places in divers Parts of England, and is rarely cultivated in Gardens. This is the Sort directed for Medicinal Use in the College Dispensatory.

The second Sort is a Variety of the first, which was accidentally obtain'd : The Flowers of this Kind are very double, and generally produced in large Bunches ; which, together with its long Continuance in Flower, renders

it worthy of a Place in every good Garden. This Sort propagates it self very fast by its Roots, which spread very far under Ground, so that it should not be planted too near other Plants, lest it over-run and destroy them.

The best time to transplant these Roots is in Autumn, that they may take Root before Winter, so that they will be in no Danger of suffering from Drought the Spring following ; and will be capable of producing stronger Stalks, and a greater Quantity of Flowers.

This Plant always makes the best Appearance when its Roots are confined ; because, when they are suffered to spread, the Stalks come up thin and straggling, and the greatest Beauty of it is, to see it grow close in large Tufts, for which Reason many Persons chuse to plant it in Pots, fill'd with light, sandy Earth, in which, if they are duly water'd in dry Weather, they will thrive exceedingly, and make a very handsome Appearance. It is also very proper to plant on such Borders as are gravelly and poor, (on which few other things will thrive) where the Roots of this Plant will be confined, more than if planted in a better Soil, and they will flower very well.

The third and fourth Sorts are seldom preserved in Flower-Gardens, being Plants of little Beauty. These may be propagated by parting their Roots, either in Spring or Autumn, and will grow upon almost any Soil, or in any Situation.

The fifth Sort was brought from the Levant by Monsieur Tournefort, but was known long before : Many of the old Botanists were of Opinion, that the Seeds of this Plant was the *Semen Santonicum* of the Shops ; but it is now generally believed to be the Seeds of some other Plant of that Kind. But however, this Plant deserves a Place in every good Garden, for the Variety of its silver-colour'd Leaves, together with its long Continuance in flower.

It may be propagated by planting Cuttings, during any of the Summer Months, upon a Bed of light, fresh Earth, observing to water and shade them until they have taken Root ; after which they will require no farther Care, but only to clear them from Weeds, until September following ; when they should be carefully taken up, preserving a Ball of Earth to the Roots of each Plant, and planted in a warm dry Situation ; and if it be on a poor gravelly or rubbishing Soil, they will endure the Cold better, and make much more beautiful Plants. This Sort seldom perfects Seeds in England.

PULEGIUM : [This Plant takes its Name of *Pulex* a Flea, because being burnt, it is said to drive away Fleas.] Penny-Royal or Pudding-Grafs.

The Characters are ;

It hath a labiated Flower, consisting of one Leaf, whose Upper-lip (or Crest) is intire, but the Lower-lip (or Beard) is divided into three Parts ; out of the Flower-cup rises the Pointal, attended by four Embryo's, which afterwards become so many Seeds ; to which may be added, That the Flowers grow in short thick Whorles.

The

The Species are ;

1. *PULEGIUM* ; *latifolium*. C. B. P. Common or broad-leav'd Penny-Royal.

2. *PULEGIUM* ; *Hispanicum, erectum, staminibus florum extantibus*. Upright Spanish Penny-Royal, whose Stamens stand out from the Flowers.

3. *PULEGIUM* ; *angustifolium*. C. B. P. Narrow-leav'd Penny-Royal.

4. *PULEGIUM* ; *angustifolium, flore albo*. H. R. Par. Narrow-leav'd Penny-Royal, with a white Flower.

The first of these Plants is very common on moist Heaths in divers Parts of England. This is the Sort recommended by the Physicians for Medicinal Use : But the second Sort, although not a Native of England, hath obtain'd in the Gardens, where Medicinal Plants are cultivated, so much as to have quite superseded the other in the Markets, for its upright Growth, early Flowering, and more beautiful Appearance ; but whether it is equally good for Use, I shall leave to those to whose Province it more immediately belongs to examine.

The third Sort is also recommended to be used in Medicine : This is not of English Growth, but is very hardy, and will thrive very well if planted on a moist Soil ; as will also the fourth Sort, which is only a Variety of the third, from which it differs in nothing but the Colour of its Flowers.

All these Plants propagate themselves very fast by their Branches trailing upon the Ground, which emit Roots at every Joint, and fasten themselves into the Earth, and send forth new Branches ; so that no more is required in their Culture, than to cut off any of these rooted Branches, and plant them out in fresh Beds, allowing them at least a Foot from Plant to Plant every Way, that they may have Room to grow.

The best Time for this Work is in September, that the Plants may be rooted before Winter ; for if the old Roots are permitted to remain so close together, as they generally grow in the Compass of a Year, they are subject to rot in Winter ; besides, the young Plants will be much stronger, and produce a larger Crop the succeeding Summer than if they were remov'd in the Spring. These Plants do all love a moist strong Soil, in which they will flourish exceedingly.

PULMONARIA ; [so call'd of *Pulmones* the Lungs, because it is suppos'd to be a very good Medicament for the Lungs.] Lungwort.

The Characters are :

The Flower consists of one Leaf, which is shap'd like a Funnel, whose upper Part is cut into several Segments ; from its fistulous Flower-cup, which is for the most part pentagonal, rises the Pointal, encompass'd by four Embryo's, which afterwards become so many Seeds enclos'd in the Flower-cup.

The Species are ;

1. *PULMONARIA* ; *vulgaris, maculoso folio*. Clus. Hist. Common spotted Lungwort, by some call'd Sage of Jerusalem, and Jerusalem Cowslip.

2. *PULMONARIA* ; *major, non maculosa*. J. B. Greater Lungwort, without Spots.

3. *PULMONARIA* ; *foliis ecbii*. Lob. Ic. Lungwort, with Leaves like Vipers-Bugloss.

4. *PULMONARIA* ; *maxima, foliis quasi saccharo incrustatis*. Pluk. Phyt. Greatest Lungwort with Leaves very much spotted.

There are several other Species of this Plant which are preserv'd in curious Botanick Gardens for Variety ; but those here mention'd are the principal Kinds which are cultivated in the English Gardens.

The first Sort is us'd in Medicine as a Vulnerary Herb, but is by many People preserv'd in Gardens ; as are also the three other Sorts, for the Variety of their spotted Leaves, and pretty Bunches of blue Flowers.

These Plants may be cultivated by parting of their Roots, which may be done either in the Spring or Autumn ; but if the Ground be moist into which they are planted, it is better to be done in the Spring, otherwise the Autumn is the most preferable Season, that the Plants may be well rooted before the dry Weather comes on in the Spring, which will cause them to flower much stronger.

The Soil in which they are planted, should not be rich, but rather a fresh, light, sandy Ground, in which they will thrive much better than in a richer Soil, in which they are very subject to rot in Winter. The fourth Sort makes the best Appearance of all the Kinds, and is very hardy, will grow either in Sun or Shade, and, taking up little Room, is worthy of a Place in every good Garden for the Sake of Variety.

PULSATILLA ; [so call'd of *Pulsando*, because the Seeds of this Plant are blown, and fly away with the least Wind.] Pasque-Flower.

The Characters are ;

The Flower consists of several Leaves, which are plac'd in a circular Order, and expand in Form of a Rose ; out of the Middle of which rises a Pointal, beset, for the most part, with Chives ; which afterwards becomes a Fruit, in which the Seeds are gather'd, as it were, into a little Head, each ending in a small Hair : To which must be added, Some little Leaves encompassing the Pedicle below the Flower, as in the Anemone ; from which the Pasque-Flower differs, in the Seed ending in a Tail.

The Species are ;

1. *PULSATILLA* ; *folio crassiore, & majore flore*. C. B. P. Pasque-Flower, with thicker Leaves and a larger Flower.

2. *PULSATILLA* ; *flore violaceo, duplici fimbriato*. H. R. Par. Pasque-Flower, with a double-fring'd Violet-colour'd Flower.

3. *PULSATILLA* ; *flore minore nigricante*. C. B. P. Pasque-Flower, with a smaller darker Flower.

4. *PULSATILLA* ; *flore rubro, obtuso*. C. B. P. Red Pasque-Flower.

5. *PULSATILLA* ; *flore albo*. C. B. P. White Pasque-Flower.

6. *PULSATILLA* ; *lutea, Apii hortensis folio*. C. B. P. Yellow Pasque-Flower, with a Leaf of Garden Parsley.

7. *PULSA-*

7. *PULSATILIA*; *lutea*, *Alpina*, *bispidioides*. C. B. P. Yellow hairy Pasque-Flower of the Alps.

The first of these Plants is common in divers Parts of England; it grows in great Plenty on Gogmagog-Hills, on the Left-hand of the Highway leading from Cambridge to Haveril, just on the Top of the Hill; also about Hildertham, six Miles from Cambridge; and on Bernack-Heath, not far from Stamford; and on Southrop-Common, adjoining thereto; also on mountainous and dry Pastures, just by Leadstone-Hall, near Pontefract in Yorkshire. It flowers about the End of March or Beginning of April.

The other Sorts are less common in England, being all of them Natives of other Countries, and are only to be met with in some curious Gardens in England, where they are cultivated for the Beauty of their Flowers.

These Plants may be propagated by Seed, which should be sown in Boxes or Pots, fill'd with very light sandy Earth; observing not to cover the Seeds too deep with Mould, which will prevent their Rising, for they require no more than just to be cover'd. These Boxes should be placed where they may have the Morning Sun until ten of the Clock, but must be skreen'd from it in the Heat of the Day; and if the Season proves dry, the Earth should be often refresh'd with Water. The best Time for sowing of these Seeds is in July, soon after they are ripe, for if they are kept till Spring they seldom grow.

These Boxes or Pots, in which the Seeds are sown, should remain in this shady Situation until the Beginning of October, when they should be remov'd where they may enjoy the full Sun during the Winter Season: About the Beginning of March the Plants will begin to appear; at which Time the Boxes should be again remov'd where they may have only the Forenoon Sun, for if they are too much expos'd to the Heat, the young Plants will die away: They should also be refresh'd with Water in dry Weather, which will greatly promote their Growth; and they must be carefully preserv'd from Weeds, which if suffer'd to grow amongst them, will in a short time destroy them.

When the Leaves of these Plants are intirely decay'd (which is commonly in July) you should then take up all the Roots, which being nearly of the Colour of the Ground, will be difficult to find while small; therefore you should pass the Earth through a fine Wire Sieve, which is the best Method to separate the Roots from the Earth (but notwithstanding all possible Care taken, yet there will be many small Roots left; so that the Earth should either be put into the Boxes again, or spread upon a Bed of light Earth, to see what Plants will arise out of it the succeeding Year :) The Roots being taken up, should be immediately planted again on Beds of light, fresh, sandy Earth, about three or four Inches asunder, covering them about three Inches thick with the same light Earth. The Spring following, most of these Plants will produce Flowers, but

they will not be so large and fair, as in the succeeding Years, when the Roots are larger.

They may also be propagated by parting of their Roots; the best Time for which is in July or August, when their Leaves are intirely decay'd, for if they are remov'd while their Leaves remain fresh, the Roots do commonly rot; these Roots being somewhat like those of *Anemonies*, may be divided into several Tubers or Heads, but should not be parted too small, which will occasion their Flowers to be very weak and but few in Number: They must always be planted in a fresh, undung'd Soil, and should have an open Situation; nor should the Roots be transplanted oftner than every other Year, if you design to have them produce strong Flowers: But the Earth upon the Surface of the Beds should be refresh'd at least once a Year, which will greatly encourage the Roots.

PUMPION; *vide* Pepo.

PUNICA: [This Plant takes its Name of its Punicean or red Colour, for its Flowers and Fruit are of a red Colour. It is call'd *Granatum*, of *Granis*, because the Fruit has many Grains; or, as some suppose, of *Granata* or *Granada*, because it grows in great Plenty in that Country.] The Pomegranate-Tree.

The Characters are;

The Flower consists of many Leaves, plac'd in a circular Order, which do expand in Form of a Rose, whose Bell-shap'd multifid Flower-cup afterwards becomes a globular Fruit, having a thick, smooth, brittle Rind, and is divided into several Cells, which contain oblong, hard Seeds, surrounded with a soft Pulp.

The Species are;

1. PUNICA; *quæ malum Granatum fert.* *Casalp.* The Common Pomegranate.
2. PUNICA; *fructu dulci.* *Tourn.* The Sweet Pomegranate.
3. PUNICA; *sylvestris.* *Cord. Hist.* The Wild Pomegranate.
4. PUNICA; *flore pleno, majore.* *Tourn.* The Double-flower'd Pomegranate.
5. PUNICA; *Americana, nana, seu humilima.* *Tourn.* The American Dwarf Pomegranate.

The first of these Trees is now pretty common in the English Gardens, where formerly it was nurst up in Cases, and preserv'd in Green-houses with great Care (as was also the Double-flowering Kind;) but they are both hardy enough to resist the severest Cold of our Climate in the open Air; and if planted against warm Walls, in a good Situation, the first Sort will often produce Fruit, which in warm Seasons will ripen tolerably well: But as these Fruits do not ripen till late in the Autumn, so they are seldom well tasted in England; for which Reason the Sort with double Flowers is commonly preferr'd to it: The Sort with sweet Fruit, as also the wild Sort, is less common in the English Gardens than the former two.

These Plants may be easily propagated by laying down their Branches in the Spring, which

which in one Year's time will take good Root; and may then be transplanted where they are design'd to remain. The best Season for transplanting of these Trees is in *Spring*, just before they begin to shoot: They should have a strong, rich Soil, in which they flower much better, and produce more Fruit than if planted on a dry poor Earth. But in order to obtain these in Plenty, there should be Care taken in the pruning of the Trees; for want of which we often see these Trees very full of small Shoots, but do not find many Flowers produc'd upon them; therefore I shall set down Directions for pruning of these Trees, so as to obtain a great Quantity of Flowers and Fruit.

The Flowers of this Tree are always produc'd at the Extremity of the Branches which were produc'd the same Year: This therefore directs, that all weak Branches of the former Year should be cut out, and that the stronger should be shorten'd in Proportion to their Strength, in order to obtain new Shoots in every Part of the Tree. These Branches may be laid in against the Wall, about four or five Inches asunder; for as their Leaves are small, so there is not a Necessity of allowing them a greater Distance. The best Time for this Work is about *Michaelmas*, or a little later, according to the Mildness of the Season; but if they are left until *Spring* before they are prun'd, they seldom put out their Shoots so early; and the earlier they come out, the sooner the Flowers will appear, which is of great Consequence where Fruit is desir'd. In *Summer* they will require no other dressing, but to cut off very vigorous Shoots which grow from the Wall, and do never produce Flowers (for it is the middling Shoots only which are fruitful) and when the Fruit is form'd, the Branches on which they are, should be fasten'd to the Wall to support them, otherwise the Weight of the Fruit, when grown large, will be apt to break them down.

Though, as I said before, the Fruit of this Tree seldom arrives to any Perfection in this Country, so as to render it valuable; yet for the Beauty of its scarlet Colour, together with the Variety of its Fruit, there should be one Tree planted in every good Garden, since the Culture is not great which they require: The chief Care is to plant them upon a rich, strong Soil, and in a warm Situation. Upon some Trees, which had these Advantages, I have observ'd a great Quantity of Fruit which have arriv'd to their full Magnitude; but I can't say they were well-flavour'd; but however, they made a very handsome Appearance upon the Trees.

The double-flowering Kind is much more esteem'd than the other in this Country, for the sake of its large, beautiful, double Flowers, which are of a most beautiful scarlet Colour, and if the Trees are supply'd with Nourishment, will continue to produce Flowers for near three Months successively, which renders it one of the most valuable Flowering-trees yet known. This must be prun'd and managed in the same Manner as hath been already directed for the Fruit-bearing Kind: But this

Sort may be render'd more productive of its beautiful Flowers, by grafting it upon Stocks of the single Kind, which will check the Luxuriancy of the Trees, and cause them to produce Flowers upon almost every Shoot; by which Method I have had a low Tree, which was planted in the open Air, extremely full of Flowers, which made a very fine Appearance.

The Dwarf Sort was brought into *Europe* from the warmest Parts of *America*, where the Inhabitants cultivate it in their Gardens for the Beauty of its Flowers, together with its continuing to produce Flowers and Fruit most Part of the Year, and do seldom grow above three Feet high. The Fruit of this Kind is seldom much larger than a *Walnut*, and not very pleasant to the Taste; so that 'tis rather cultivated for Shew than for the Sake of its Fruit.

This Plant may be propagated by Layers in the same manner as the former Sorts, but must be planted in Pots fill'd with rich Earth, and preserv'd in a Stove, otherwise it is too tender to endure the Cold of our *Winters*; and in the *Summer*, when the Flowers begin to appear, if the Plants are expos'd to the open Air, the Buds will fall off, and never open; so that it should seldom be remov'd into the open Air, but be constantly preserv'd in the Stove with other Plants of the same Country; observing never to place them too near the Heat, which will cause them to produce long Shoots, but no Flowers will appear upon them; but rather let them have a moderate Warmth, in which they will thrive better than in a greater Heat.

I have heard of a Sort of *Pomegranate* with double-strip'd Flowers, and have seen it mention'd in some foreign Catalogues, but have not seen the Plant growing, tho' I believe it may be easily procur'd from *Italy*.

PURSLAIN; *vide* Portulaca.

PYRACANTHA; *vide* Mespilus.

PYLUS; The Pear-Tree.

The Characters are;

The Flower consists of several Leaves, which are plac'd in a circular Order, and do expand in Form of a Rose; whose Flower-cup afterwards becomes a fleshy Fruit, which is more produc'd toward the Footstalk than the Apple, but is hollowed like a Navel at the extreme Part; the Cells, in which the Seeds are lodg'd, are separated by soft Membranes, and the Seeds are oblong.

The Species are;

1. PYRUS; *sativa*, fructu aspero, parvo racemoso, odoratissimo. *Tourn.* Petit Muscat, i. e. Little Musk Pear, commonly call'd, The Supreme. This Fruit is commonly produced in large Clusters; it is rather round than long; the Stalk short, and when full ripe, the Skin is of a yellow Colour; the Juice is somewhat musky, and if gathered before it is too ripe, is an excellent Pear. This ripens the Beginning of *July*, and will continue good but for a few Days.

2. PYRUS;

2. PYRUS; *sativa, fructu æstivo, minimo odoratissimo*. Tourn. Poir de Chio, i. e. The Chio Pear, commonly call'd The little Bastard Musk Pear. This is smaller than the former, but is in Shape pretty much like that; the Skin, when ripe, has a few Streaks of red on the Side next the Sun, and the Fruit doth seldom hang in Clusters as the former, but in other Respects is nearly like it.

3. PYRUS; *sativa, fructu æstivo, parvo, è viridi albido*. Tourn. Poire Hativeau, i. e. The Hasting Pear, commonly call'd The Green Chiffel. This is a larger Pear than either of the former, and is more produc'd toward the Pedicle; the Skin is thin, and of a whitish green Colour when ripe; the Flesh is melting, and if not too ripe, of a sugary Flavour. This ripens in the Middle of July.

4. PYRUS; *sativa, fructu æstivo, partim saturatè rubente, partim flavescente*. Tourn. Muscadelles Rouges, i. e. The Red Muscadelle. It is also call'd La Bellissime, i. e. The Fairest. This is a large early Pear, of great Beauty; the Skin is of a fine yellow Colour, when ripe, beautifully strip'd with red; the Flesh is melting, and has a rich Flavour, if gathered before it be too ripe. This generally produces two Crops of Fruit in a Year; the first is commonly ripe about the Middle of July, and the second ripens in September; but this late Crop is seldom well-tasted.

5. PYRUS; *sativa, fructu æstivo, parvo, flavescente moscato*. Tourn. Petit Muscat, i. e. The little Muscat. This is a small Pear, rather round than long; the Skin is very thin, and when ripe, of a yellowish Colour; the Flesh is melting, and of a rich musky Flavour, but will not keep long when ripe. This comes the Middle of July.

6. PYRUS; *sativa, fructu æstivo, oblongo, ferrugineo, carnè tenerà moscata*. Tourn. Jargonelle. This is a very long Pear, of a Pyramidal Shape, having a long Footstalk; the Skin is pretty thick, of a Russet-green Colour from the Sun, but towards the Sun it is inclin'd to an Iron Colour; the Flesh is breaking, and has a rich musky Flavour. Ripe the Middle of July. This is one of the best Summer Pears yet known, and is certainly what all the French Gardeners did formerly call the *Cuisse Madam*, as may be easily observed by their Description of this Pear; but how that Name came to be applied to another Fruit in this Country, which is vastly inferior to it, I can't say.

7. PYRUS; *sativa, fructu oblongo, è viridi flavescente*. The Windsor Pear. This is an oblong Fruit, which is produced toward the Crown, but near the Stalk is drawn toward a Point; the Skin is smooth, and when ripe, of a yellowish-green Colour; the Flesh is very soft, and if it be permitted to hang but two or three Days after it is ripe, it grows mealy, and is good for nothing.

8. PYRUS; *sativa, fructu æstivo, oblongo, è viridi albo*. *Cuisse Madam*; vulgè. This, I am apt to believe, is what the French Gardeners call the *Jargonelle*; which, as I before observed, is now given to another Fruit, which

is much preferable to this; so that the two Names are changed: For the *Jargonelle* is always placed amongst those which the French call bad Fruit; and the *Cuisse Madam* is set down amongst their best Fruit: which is certainly the Reverse with us, as they are now nam'd. This Pear is somewhat like the *Windsor*, but is more produc'd toward the Crown, and is smaller toward the Stalk; the Skin is smooth, of a pale-green Colour; the Flesh is apt to be mealy, if it stands to be ripe.

9. PYRUS; *sativa, fructu æstivo, globoso sessili, moscato, maculis nigris, consperso*. Tourn. Orange Musquée, i. e. The Orange Musk. This is a middle-sized Pear, of a short globular Form; the Skin is of a yellowish Colour, spotted with black; the Flesh is musky, but is very apt to be a little dry and choaky. It ripens the End of July.

10. PYRUS; *sativa, fructu æstivo, albido majori*. Tourn. Gros Blanquet, i. e. Great Blanket. This is also call'd *La Mussette d'Anjou*, i. e. The Bagpipe of Anjou. This is a large Pear, approaching to a round Form; the Skin is smooth, and of a pale-green Colour; the Flesh is soft, and full of Juice, which hath a rich Flavour. The Stalk is short, thick, and spotted, the Wood is slender, and the Leaf is very much like that of the Tree call'd the *Jargonelle*. This ripens the End of July.

11. PYRUS; *sativa, fructu æstivo, albido, saccharato odoratissimo*. Tourn. The Blanquette, or Musk Blanquette; the little Blanket Pear. This Pear is much less than the former, and more pinch'd in near the Stalk, which is also short, but slenderer than that of the former; the Skin is soft, and of a pale-green Colour; the Flesh is tender, and full of a rich musky Juice. The Wood of this Tree is much stronger than is that of the former, and the Shoots are commonly shorter. This ripens the End of July.

12. PYRUS; *sativa, fructu æstivo, albido, pediculo longo donato*. Tourn. Blanquette a longue queue, i. e. Long-stalk'd Blanket Pear. This Pear is in Shape somewhat like the former, but the Eye is larger, and more hollow'd at the Crown; towards the Stalk it is somewhat plumper, and a little crooked; the Skin is very smooth, white, and sometimes toward the Sun is a little colour'd; the Flesh is between melting and breaking, and is full of a rich sugary Juice. This ripens the Beginning of August.

13. PYRUS; *sativa, fructu æstivo, oblongo, rufescente saccharato*. Tourn. Poire sans Peau, i. e. The Skinless Pear. It is also call'd *Fleur de Guigne*, i. e. Flower of Guigne; and *Roussellet bâtiff*, i. e. The Early Russetlet. This is a middle-sized Fruit of a long Shape, and a reddish Colour, somewhat like the *Russetlet*; the Skin is extremely thin; the Flesh is melting, and full of a rich sugary Juice. This ripens the End of July.

14. PYRUS; *sativa, fructu æstivo, turbinato, carnè tenerà, saccharatè*. Tourn. Muscat Robin, i. e. The Musk Robin Pear. This is also call'd *Poir à la Reine*, i. e. The Queen's Pear;

Pear; *Poire d'Ambre*, i. e. The Amber Pear; and *Pucelle de Xaintonge*, i. e. The Virgin of Xaintonge. This is a small round Pear, of a yellowish Colour when ripe; the Flesh is melting, and has a rich musky Flavour. It is a great Bearer, and ripens the End of July.

15. PYRUS; *sativa, fructu æstivo, turbinato, moscato*. Le Bourdon Musqué, i. e. The Musk Drone Pear. This is a middle-siz'd, round Fruit, whose Skin is of a yellowish Colour when ripe; the Flesh is melting, and full of a high, musky Juice; but it must not hang too long on the Tree, for it is subject to grow mealy in a short Time. This ripens the End of July.

16. PYRUS; *sativa, fructu æstivo, globoso, sessili, è viridi purpurascence saccharato, odorato*. Tourn. Orange Verte, i. e. The Green Orange Pear. This Pear hath been the most common of all the Sorts in France, which was occasion'd by the general Esteem it was in some Years since. This is a middle-siz'd, round Fruit, of a greenish Colour, but the Side next the Sun changes to a purple Colour when ripe; the Flesh is melting, and the Juice is sugar'd, with a little Perfume; the Eye is very hollow, and the Stalk is short. This ripens the Beginning of August.

17. PYRUS; *sativa, fructu æstivo, oblongo minori, cinereo, odorato*. Tourn. Cassiolette. This is so call'd from its being shap'd like a Perfuming-pot. It is a long Fruit, in Shape like the *Fargonelle*, of an ash Colour; its Flesh is melting, and full of a perfum'd Juice, but is very apt to rot in the Middle so soon as ripe, otherwise it would be esteem'd an excellent Pear. It is ripe the Beginning of August.

18. PYRUS; *sativa, fructu æstivo, turbinato, è viridi albido*. *Poire Magdaléné*, i. e. The Magdalene Pear. This is a large, round Pear, in Shape like a *Burgamot*; the Skin is green, and the Flesh is melting, but it is very subject to rot upon the Tree, which renders it not near so valuable as some others. It ripens the End of July.

19. PYRUS; *sativa, fructu æstivo, globoso, è viridi purpurascence*. Tourn. Gros Oignonet, i. e. The Great Onion Pear: It is also call'd *Amiré-roux*, i. e. Brown Admir'd; and *Roy d'Espé*, i. e. King of Summer. This is a middle-siz'd, round Pear, of a brownish Colour next the Sun; the Flesh is melting, and the Juice is passably good. This ripens the End of July.

20. PYRUS; *sativa, fructu æstivo, globoso, sessili, ex albido flavescence saccharato, odorato*. Tourn. Robine. It is also call'd *Muscato d'August*, i. e. The August Muscat; *Poire d'Averat*, i. e. The Averat Pear; and *Poire Royale*, i. e. The Royal Pear. This is a roundish, flat Pear, in Shape very like a *Burgamot*; the Stalk is long, straight, and a little spotted, and the Eye is a little hollowed; the Skin is smooth, and of a whitish-yellow Colour; the Flesh is breaking, but not hard, and its Juice is richly sugar'd and perfum'd: It is a great Bearer, and is esteem'd one of the best Summer Pears yet known. It ripens in August.

21. PYRUS; *sativa, fructu æstivo, globoso,*

sessili, odorato. Tourn. *Poire-rose*, i. e. The Rose Pear. This is a short, round Fruit, of a yellowish-green Colour, but a little inclining to red on the Side next the Sun; the Stalk is very long and slender; the Flesh is breaking, and the Juice is musky. This ripens in August.

22. PYRUS; *sativa, fructu æstivo, globoso, albido, saccharato*. Tourn. *Poire du Bouchet*. This is a large, round, whitish Pear, shap'd somewhat like the *Besidery*; the Flesh is soft and tender, and the Juice is sugary. This ripens the Middle of August.

23. PYRUS; *sativa, fructu æstivo, turbinato, sessili, saturatus rubente punctato*. Tourn. *Poire de Parfum*, i. e. The perfum'd Pear. This is a middle-siz'd, round Fruit, whose Skin is somewhat thick and rough, and of a deep-red Colour, spotted with brown; the Flesh is melting, but dry, and has a perfum'd Flavour. This ripens the Beginning of August.

24. PYRUS; *sativa, fructu æstivo, oblongo, magno, partim rubro, partim albido, odorato*. Tourn. Bon-Chrétien d'Espé, i. e. The Summer Bonchrétien or Good Christian. This is a large oblong Fruit, whose Skin is smooth and thin; the Side next the Sun is of a beautiful red Colour, but the other Side is of a whitish-green; the Flesh is between breaking and tender, and is very full of Juice, which is of a rich perfum'd Flavour. It ripens the End of August.

25. PYRUS; *sativa, fructu æstivo, globoso, ex rubro albidoque flavescence saccharato, odorato*. Tourn. *Salviati*. This Pear is pretty large, round, and flat, very much like the *Besidery* in Shape, but not in Colour; the Stalk is very long and slender, and the Fruit is a little hollow'd both at the Eye and Stalk; the Colour is Red and Yellow next the Sun, but on the other Side is whitish; the Skin is rough; the Flesh is tender, but a little soft; the Juice is sugary, and perfum'd, somewhat like the *Robine*, but is not near so moist. This ripens the End of August.

26. PYRUS; *sativa, fructu æstivo, globoso, sessili, rufescence, odorato*. *Caillot-rosat*, i. e. Rose-water Pear. This is a large round Pear, somewhat like the *Messire-Jean*, but rounder; the Stalk is very short, and the Fruit is hollow'd like an Apple where the Stalk is produc'd; the Skin is rough, and of a brown Colour; the Flesh is breaking, and the Juice is very sweet. This ripens the End of August.

27. PYRUS; *sativa, fructu æstivo, longo acerbitate strangulationem minitante*. Tourn. *Poire d'Etrangillon*, i. e. The Choaky Pear. This is seldom preserv'd in Gardens, so there needs no Description of it.

28. PYRUS; *sativa, fructu æstivo, oblongo, è ferrugineo rubente, nonnunquam maculato*. *Poire de Rouffelet*, i. e. The Ruffelet Pear. This is a large oblong Pear; the Skin is brown, and of a dark-red Colour next the Sun; the Flesh is tender and soft, without much Core; the Juice is agreeably perfum'd, if gather'd before it be too ripe. This produces larger Fruit on an *Espalier* than on Standard-Trees. It ripens the End of August.

29. PYRUS;

29. PYRUS; *sativa, fructu æstivo, subrotundo, partim rubro, partim flavescente, odorato*. Poire de Prince, i. e. The Prince's Pear. This is a small, roundish Pear, of a bright red Colour next the Sun, but of a yellowish Colour on the opposite Side; the Flesh is between breaking and melting: the Juice is very high-flavour'd, and it is a great Bearer. This ripens the End of August; but will keep a Fortnight good, which is what few Summer Fruits will do.

30. PYRUS; *sativa, fructu æstivo, globoso, viridi, in ore liquecente*. Gros Mouille-bouche, i. e. The Great Mouth-water Pear. This is a large round Pear, with a smooth green Skin: the Stalk is short and thick, the Flesh is melting and full of Juice, if gather'd before it be too ripe, otherwise it is apt to grow mealy. This ripens the Middle of August.

31. PYRUS; *sativa, fructu æstivo, rotundo, sessili, saccharato, è viridi flavescente*. Bergamotte d'Estè, i. e. Summer Burgamot. This is by some call'd the Hambden's Burgamot. This is a pretty large round flat Pear, of a greenish-yellow Colour, and hollow'd a little at both Ends like an Apple; the Flesh is melting, and the Juice is highly perfum'd. This ripens the Middle of August.

32. PYRUS; *sativa, fructu autumnali, sessili, saccharato, odorato è viridi flavescente, in ore liquecente*. Tourn. Bergamotte D'Automne, i. e. The Autumn Burgamot. This is a smaller Pear than the former, but is nearly of the same Shape; the Skin is of a yellowish Green but changes to a faint Red on the Side next the Sun; the Flesh is melting, and its Juice is richly perfum'd; it is a great Bearer, and ripens the Middle of September.

33. PYRUS; *sativa, fructu autumnali, turbinato, viridi, striis sanguineis distincta*. Tourn. Bergamotte de Suisse, i. e. The Swiss Burgamot. This Pear is somewhat rounder than either of the former, the Skin is tough, of a greenish Colour, strip'd with Red; the Flesh is melting, and full of Juice, but it is not so richly perfum'd as either of the former. This ripens the End of September.

34. PYRUS; *sativa, fructu autumnali, suavisimo, in ore liquecente*. Tourn. Beurre rouge, i. e. The Red Butter-Pear; it is call'd l'Amboise, and in Normandy Isambert; as also Beurre gris, i. e. The grey Butter; and Beurre vert, i. e. The green Butter-Pear. All these different Names of Buerre's have been occasion'd by the Difference of the Colours of the same Sort of Pear, which is either owing to the different Exposure where they grew, or from the Stock; those upon Quince Stocks being commonly of a browner Colour than those which are upon free Stocks, whence some Persons have suppos'd them to be different Fruits, though, in reality, they are the same. This is a large long Fruit, for the most part of a brown Colour; the Flesh is very melting and full of a rich sugary Juice; it ripens the End of September, and, when gather'd from the Tree, is one of the very best Sort of Pears we have.

35. PYRUS; *sativa, fructu autumnali, tur-*

binato, sessili, flavescente & in ore liquecente. Tourn. Le Doyenné, i. e. The Deans Pear. It is also call'd by all the following Names; Saint Michel, i. e. Saint Michael; Beurre blanc d'Automne, i. e. the White Autumn Butter Pear; Poire de Neige, i. e. the Snow Pear; Bonne Ente, i. e. a Good Graft; the Carlisse and Valentia. This is a large fair Fruit, in Shape somewhat like the Grey Beurre, but is shorter and rounder; the Skin is smooth, and, when ripe, changes to a yellowish Colour; the Flesh is melting and full of Juice, but it will not keep good a Week after it is gather'd, being very subject to grow mealy. This is a great Bearer, and ripens the End of September.

36. PYRUS; *sativa, fructu autumnali, longo, viridique, odorato, in ore liquecente*. Tourn. La Verte-longue, i. e. The Long Green Pear: It is also call'd Mouille-bouche d'Automne, i. e. The Autumn Mouth-Water Pear. This is a long Fruit, which is very green when ripe; the Flesh is melting, and very full of Juice; which (if it grows upon a dry warm Soil, and upon a free Stock) is very sugary, otherwise it is but a very indifferent Pear. It ripens the Beginning of October.

37. PYRUS; *sativa, fructu autumnali, tuberoso, sessili, saccharato, carne durâ*. Tourn. Messire-Jean blanc & gris, i. e. The White and Grey Monsieur John. These, although made two Sorts of Fruit by many Persons, are indubitably the same; the Difference of their Colour proceeding from the different Soils and Situations where they grow, or the Stocks on which they are grafted. This Pear, when grafted on a free Stock, and planted on a middling Soil, neither too wet, nor over dry, is one of the best Autumn Pears yet known; but when it is grafted on a Quince Stock, it is very apt to be stony; or if planted on a very dry Soil, is very apt to be small and good for little, unless the Trees are water'd in dry Seasons: which has render'd it less esteem'd by some Persons who have not consider'd the Cause of their Hardness; for when it is rightly manag'd, there is not any Pear in the same Season to be compar'd with it. This is a large roundish Fruit, the Skin is rough, and commonly of a brown Colour; the Flesh is breaking, and very full of a rich sugar'd Juice. It ripens the Beginning of October, and will continue good most Part of the Month.

38. PYRUS; *sativa, fructu autumnali, globoso, ferrugineo, carne tenerâ, sapidissima*. Tourn. Muscat fleurî, i. e. The flower'd Muscat. It is also call'd Muscat à longue queue d'Automne, i. e. The Long-stalk'd Muscat of the Autumn. This is an excellent Pear, of a middling Size, and round; the Skin is of a dark red Colour; the Flesh is very tender, and of a delicate Flavour. It ripens in the Middle of October.

39. PYRUS; *sativa, fructu autumnali, globoso, ferrugineo, carne viscida*. Tourn. Poire de Vigne, i. e. The Vine Pear. This is a round Fruit, of a middling Size; the Skin is of a dark red Colour; the Flesh is very melting, and full of a clammy Juice; the Stalk is very long and slender. This Fruit should be gather'd before it be full ripe, otherwise it

grows mealy, and soon rots. It ripens the Middle of *October*.

40. *PYRUS; sativa, fructu autumnali, oblongo, dilute rufescente, saccharato, odoratissimo. Tourn.* Poire Rouffeline, *i. e.* The Rouffeline Pear. It is also call'd in *Touraine*, *Le Muscat à longue-queue de la fin d'Automne, i. e.* The Long-stalk'd Muscat of the End of Autumn. This is by some *English* Gardeners call'd the *Brute-bonne*; but that is a very different Fruit from this. It is shap'd somewhat like the *Roufflet*, but the Skin of this is smooth, and of a greenish Yellow from the Sun, but the Side next the Sun is of a deep Red Colour, with some Spots of Grey; the Flesh is very tender and delicate; the Juice is very sweet, with an agreeable Perfume. It ripens the Beginning of *October*, but must not be long kept lest it rot in the Middle.

41. *PYRUS; sativa, fructu autumnali, oblongo, majori, cinereo. Tourn.* Poire Pendar, *i. e.* The Knife's Pear. This is very like the *Casselette* Pear, but is somewhat larger; the Flesh is fine and tender; the Juice is very much sugar'd. It ripens the End of *October*.

42. *PYRUS; sativa, fructu autumnali, turbinate, tuberoso, viridi, saccharato, in ore liquescente. Tourn.* Sucre-vert, *i. e.* The Green Sugar-Pear. This Pear is shap'd like the *Winter-Thorn*, but is smaller; the Skin is very smooth and green; The Flesh is very buttery; the Juice is sugar'd, and of an agreeable Flavour; but it is sometimes subject to be stony in the Middle, especially if grafted on a *Quince* Stock.

43. *PYRUS; sativa, fructu autumnali, tuberoso, sessili, è viridi, flavescente maculis nigris conferso, carne tenera saccharata. Tourn.* La Marquise, *i. e.* The Marquis's Pear. This is often of two different Shapes, according to the Nature of the Soil where they are planted; for when the Soil is dry, the Fruit very much resembles a fine Blanquet; but when the Soil is very rich and moist, it grows much larger: It is a well-shap'd Pear, flat at the Top; The Eye is small, and hollow'd; the Skin is of a greenish Yellow, a little inclining to Red on the Side next the Sun: If this Pear does not change yellow in ripening, it is seldom good; but if it does, the Flesh will be tender and delicate, very full of Juice, which is sugar'd. It ripens the End of *October*.

44. *PYRUS; sativa, fructu autumnali, oblongo, partim albido, partim rufescente.* The Chat brûlé, *i. e.* The burnt Cat. It is also call'd *Pucelle de Xaintonge, i. e.* The Virgin of Xaintonge. This is a small, oblong Pear, shap'd much like the *Martin Sec*, but differs from it in Colour; this being of a pale Colour on one Side, but of dark Brown on the other; the Skin is smooth; the Flesh is tender, but dry, and if kept a short time, is apt to grow mealy. It is in eating the latter End of *October*.

45. *PYRUS; sativa, fructu autumnali, globoso, sessili è albido flavescente.* Le Besidéry. It is so call'd from *Héri*, which is a Forest in *Bretagne* between *Rennes* and *Nantes*, where this Pear was found. This is a middle-siz'd, round Pear, of a pale Green, inclining to a

yellowish Colour; the Stalk is very long and slender; the Flesh is dry, and but very indifferent for eating, but it bakes well. It ripens the End of *October*.

46. *PYRUS; sativa, fructu brumali, sessili, è viridi flavescente, maculato, utrinque umbilicato, in ore liquescente. Tourn.* The Crasane or Burgamot Crasane. It is also call'd *Beurre Plat, i. e.* the flat Butter Pear. This is a middle-siz'd round Pear, hollow'd at both Ends like an Apple; the Stalk is very long and crooked; the Skin is rough, of a greenish yellow Colour when ripe, cover'd over with a Russet Coat; the Flesh is extremely tender, and buttery, and is full of a rich sugar'd Juice. This is in eating the Beginning of *November*.

47. *PYRUS; sativa, fructu brumali, turbinate sessili, flavescente, saccharato, odorato, in ore liquescente. Tourn.* Lansac ou la Dauphine, *i. e.* the Lansac or Dauphine Pear. This Pear is commonly about the ordinary Size of a *Burgamot*, of a roundish Figure, flat towards the Head, but a little produc'd towards the Stalk; the Skin is smooth, and of a yellowish green Colour; the Flesh is yellow, tender, and melting; the Juice is sugar'd, and a little perfum'd; the Eye is very large, as is also the Flower, and the Stalk is long and strait. When this Pear is upon a free Stock, and planted on a good Soil, it is one of the best Fruits of the Season; but when it is on a *Quince* Stock, or upon a very dry Soil, the Fruit will be small, stony, and worth little. It ripens the Beginning of *November*.

48. *PYRUS; sativa, fructu brumali, oblongo, partim intense, partim dilute ferrugineo, saccharato, odorato. Tourn.* Martin-sec, *i. e.* The Dry Martin. This is sometimes call'd the *Dry Martin* of *Champaign*, to distinguish it from another *Dry Martin* of *Burgundy*. This Pear is almost like the *Russelet* in Shape and Colour, which has occasion'd some Persons to give it the Name of *Winter Russelet*. It is an oblong Pear, whose Skin is of a deep Russet Colour of one Side, but the other Side is inclining to a Red; the Flesh is breaking and fine; the Juice is sugar'd, with a little Perfume, and if grafted on a free Stock, is an excellent Pear; but if it be on a *Quince* Stock, it is very apt to be stony. It is in eating the Middle of *November*; but if they were permitted to hang their full time on the Tree, will keep good two Months.

49. *PYRUS; sativa, fructu brumali, magno sessili, è cinereo flavescente. Tourn.* La Villaine d'Anjou, *i. e.* The Villain of Anjou. It is also call'd *Poire Tulipée, i. e.* The Tulip Pear; and *Bigarrade, i. e.* The Great Orange. This is a large round Pear, with a very long slender Stalk; the Skin is of a pale yellow Colour; the Flesh is breaking, but not very full of Juice. This is in eating the Middle of *November*.

50. *PYRUS; sativa, fructu brumali, flavescente, odoratissimo, pediculo crassiori. Tourn.* Poire de Gros-queue, *i. e.* The large-stalk'd Pear. This is a large roundish Pear, with a yellow Skin; the Stalk is very thick, from whence it had the Name; the Flesh is breaking, and dry, and has a very musky Flavour, but it is

apt

apt to be stony, especially if it be planted in a dry Soil, or grafted on a *Quince* Stock, as are most of the perfum'd *Pears*.

51. *PYRUS; sativa, fructu brumali, turbinato, rufescente odorato. L' Amadote, i. e. The Amador Pear.* This is a middle-siz'd *Pear*, somewhat long, but flat at the Top; the Skin is generally rough, and of a *Rufet* Colour; the Flesh is dry, and high-flavour'd, if grafted on a free Stock. The Wood of this Tree is generally thorny, and is esteem'd the best Sort of *Pears* for Stocks to graft the melting *Pears* upon, because it gives them some of its fine musky Flavour. It is in eating the End of *November*, but will keep good six Weeks.

52. *PYRUS; sativa, fructu brumali, globoso, dilute virente tuberoso, punctato, in ore liquescente. Tourn. Petit-Oin, i. e. Little Lard Pear.* It is also call'd *Rouvar*, and *Rouffette d' Anjou, i. e. The Russet of Anjou*; and *Amadont*; and *Marveille d' Hyver, i. e. The Wonder of the Winter.* This *Pear* is of the Size and Shape of the *Ambret* or *Leschasserie*, but the Skin is of a clear green Colour, and a little spotted; the Stalk is pretty long, and slender; the Eye is large, and deeply hollow'd; the Flesh is extremely fine, and melting; the Juice is much sugar'd, and has an agreeable musky Flavour. It is in eating the End of *November* and most Part of *December*, and is esteem'd one of the best Fruits in that Season.

53. *PYRUS; sativa, fructu brumali, longo, à viridi albicante, in ore liquescente. Tourn. Louise-bonne, i. e. The Good Lewis Pear.* This *Pear* is shap'd somewhat like the *St. Germain*, or the *Autumn Verlounge*, but is not quite so much pointed; the Stalk is very short, fleshy, and somewhat bent; the Eye and the Flower is small; the Skin is very smooth; the Colour is green, inclining to a white when ripe; the Flesh is extremely tender, and full of Juice, which is very sweet, especially when it grows upon a dry Soil, otherwise it is apt to be very large and ill-tasted. It is in eating the latter End of *November* and the Beginning of *December*.

54. *PYRUS; sativa, fructu brumali, tuberoso, à viridi flavescente, punctato saccharato. Tourn. Poire de Colmar, i. e. The Colmar Pear.* It is also call'd *Poire Manne*, The Manna *Pear*; and *Bergemotte Tardive*, The late *Burgamot*. This *Pear* is somewhat like a *Boncret en* in Shape, but the Head is flat; the Eye is large, and deeply hollow'd; the Middle is larger than the Head, and is slop'd toward the Stalk, which is short, large, and a little bent; the Skin is green, with a few yellowish Spots, but is sometimes a little colour'd on the Side next the Sun; the Flesh is very tender, and the Juice is greatly sugar'd. It is in eating the latter End of *November*, but will often keep good till *January*, and is esteem'd one of the best Fruits of that Season.

55. *PYRUS; sativa, fructu brumali, globoso, Citrifirmi, flavescente, punctato, in ore liquescente, saccharato, odoratissimo. Tourn. L' Echasserie.* It is also call'd *Verte-longue d' Hyver, i. e. The Winter-long green Pear*; and *Besideri-Landri, i. e. The Landry Wilding.* This

Pear is shap'd like a *Citron*; the Skin is smooth, and of a green Colour, with some Spots while it hangs on the Tree, but as it ripens, it becomes of a yellowish Colour; the Stalk is strait and long; the Eye is small, and not hollow'd; the Flesh is melting, and buttery; the Juice is sugar'd with a little Perfume. It is in eating the latter End of *November*, and continues good till *Christmas*.

56. *PYRUS; sativa, fructu brumali, longo à viridi flavescente, in ore liquescente, saccharato. Tourn. La Virgoulé, or La Virgoleuse.* It is also call'd *Bujaleuf*, and *Chambrette*; and *Poire de Glasse, i. e. The Ice Pear, in Gascony*; but it is call'd *Virgoute*, from a Village of that Name in the Neighbourhood of *St. Leonard* in *Limousin*; where it was rais'd, and sent to *Paris* by the Marquess of *Chambret*. This *Pear* is large, long, and of a green Colour, inclining to yellow as it ripens; the Stalk is short, fleshy, and a little bent; the Eye is of a middling Size, and a little hollow'd; the Skin is very smooth, and sometimes a little colour'd towards the Sun; the Flesh is melting, and full of a rich Juice. It is in eating the latter End of *November*, and will continue good till *January*, and is esteem'd one of the best Fruits of the Season, but the Tree is very apt to produce vigorous Shoots, and the Blossoms being generally produc'd at the extreme Part of the Shoot, where they are shorten'd, the Fruit will be intirely cut away, which is the Reason it is condemn'd as a bad Bearer; but when it is grafted on a free Stock, it ought to be allow'd at least thirty Feet to spread; and if upon a *Quince* Stock, it should be allow'd upwards of twenty Feet, and the Branches train'd in against the *Espalier* or Wall, at full Length, in an horizontal Position, as they are produc'd. Where this Tree is thus treated, it will bear very plentifully.

57. *PYRUS; sativa, spinosa, fructu globoso, sessili, ferrugineo, in ore liquescente, saccharato, odoratissimo. Tourn. Poire d' Ambrette.* This is so call'd from its musky Flavour, which resembles the Smell of the *Sweet Sultan Flower*, which is call'd *Ambrette* in *France*. This *Pear* is like the *Leschasserie* in Shape, but is of a *Rufet* Colour; the Eye is larger, and more hollow'd; the Flesh is melting, and the Juice is richly sugar'd and perfum'd; the Seeds are large and black, and the Cells in which they are lodged are very large; the Wood is very thorny, especially when grafted on free Stocks. The Fruit is in eating the latter End of *November*, and continues good till the latter End of *January*, and is esteem'd a very good Fruit by most People.

58. *PYRUS; sativa, fructu brumali, magno, pyramidato, albido, in ore liquescente, saccharato, odorato. Tourn. Epine d' Hyver, i. e. Winter Thorn Pear.* This is a large fine *Pear*, nearly of a pyramidal Figure; the Skin is smooth, and of a pale-green Colour, inclining to yellow as it ripens; the Stalk is short and slender; the flesh is melting and buttery; the Juice is very sweet, and, in a dry Season, is highly perfum'd; but when it is planted on a moist Soil, or the Season proves wet, it is very insipid,

insipid, so that it should never be planted on a strong Soil. It ripens the End of November, and will continue good two Months.

59. *PYRUS; sativa, fructu brumali, longc, è viridi flavescente, in ore liquecente. Tourn.* La Saint Germain, *i. e.* The Saint Germain Pear. It is also call'd *L inconnue de la Fare, i. e.* The Unknown of La Fare; it being first discover'd upon the Banks of a River which is call'd by that Name, in the Parish of *St. Germain*. This is a large long Pear, of a yellowish green Colour when ripe; the Flesh is melting, and very full of Juice, which in a dry Season, or if planted on a warm, dry Soil, is very sweet; but when it is planted on a moist Soil, the Juice is very apt to be harsh and austere, which renders it less esteem'd by some Persons, though in general it is greatly valu'd. This is in eating the End of November, but will many times continue good till Christmas.

60. *PYRUS; sativa, fructu brumali, tuberoso, subacido, flavescente punctato. Tourn.* Saint Augustine. This is about the Size of a middling *Virgoulé* Pear, but is somewhat shorter, and slenderer near the Stalk; the Skin is of a fine Ciron Colour, spotted with Red on the Side next the Sun; the Flesh is tender, but not buttery, and is pretty full of Juice, which is often a little sharp, which to some Persons is disagreeable, but others value it on that account. This is in eating in December, and will continue good two Months.

61. *PYRUS; sativa, fructu brumali, pyramidato, partim purpureo, punctis nigris consperso, partim flavescente. Tourn.* Bon-Chrétien d'Espagne, *i. e.* The Spanish Bon-Chrétien. This is a large Pear of a pyramidal Form; of a fine Red or Purple Colour on the Side next the Sun, and full of small black Spots; the other Side is of a pale yellow Colour; the Flesh is breaking, and when it is on a light rich Soil, and grafted on a free Stock, its Juice is very sweet. It ripens in the Beginning of December, and will continue good a Month or six Weeks. If this be grafted on a Quince Stock, it is very apt to be dry and stony.

62. *PYRUS; sativa, fructu brumali, magno, oblongo, turbinate, ferrugineo, utrinque umbilicato. Tourn.* Poire de Livre, *i. e.* The Pound Pear. It is also call'd *Gros Ratteau Gris, i. e.* The Grey Rak'd Pear; and *Poire d'Amour, i. e.* The Lovely Pear. This is a very large Pear, each of which does commonly weigh a Pound or more; the Skin is rough, and of an obscure red Colour on the Side next the Sun, but somewhat paler on the other Side; the Stalk is very short, and the Eye is greatly hollow'd. This is not fit for eating, but bakes or stews exceedingly well, and is in Season from November to Christmas.

63. *PYRUS; sativa, fructu brumali, parvo, flavescente, maculis rubris consperso. Tourn.* Betsy de Cassoy, *i. e.* The Wilding of Cassoy, a Forest in Brittany, where it was discover'd, and passes under the Name of *Rousses d'Anjou*. It is also call'd *Petit Beurre d'Hyver, i. e.* Small Winter Butter Pear. This is a small roundish Pear, of a yellowish Colour spotted with Red;

the Flesh is melting, and the Juice is very rich. It is in eating in December and January. This is a prodigious Bearer, and commonly produces its Fruit in large Clusters, provided it be not too much pruned, for it generally produces its Blossom-buds at the Extremity of its Shoots, which if shorten'd, the Fruit would be cut away. There was a Tree of this Kind in the Gardens of *Camden-House* near *Kensington*, which generally produc'd a great Quantity of Fruit.

64. *PYRUS; sativa, fructu brumali, turbinate, inaequali ventre tumido, partim purpureo, partim flavescente. Tourn.* Ronville. It is also call'd *Hocrenaille*, and *Martin-Sire, i. e.* The Lord Martyn Pear. This Pear is about the Size and Shape of a large *Rousses*; the Eye is of a middling Size, and hollow'd a little; the Middle of the Pear is generally swell'd more on one Side than of the other, but is equally extended towards the Stalk; the Skin is very smooth and soft, and is of a lively red Colour next the Sun; but on the other Side it changes yellow as it ripens; the Flesh is breaking, and full of Juice, which is very sweet, and a little perfum'd; but if grafted on a Quince Stock, is very apt to be small and stony.

65. *PYRUS; sativa, fructu brumali, Citriformi, flavescente, duro, Moschato, odoratissimo. Tourn.* Citron d'Hyver, *i. e.* The Winter Citron Pear. It is also call'd the *Musk Orange* Pear in some Places. This is a pretty large Pear, in Shape and Colour very like a Citron, from whence it had its Name; the Flesh is hard, and dry, and very subject to be stony, for which Reasons it is not valued as an eating Pear, but will bake very well. It is in Season from December to March.

66. *PYRUS; sativa, fructu brumali, oblongo, è viridi flavescente, saccharato, saporis austeri. Tourn.* Rosselet d'Hyver, *i. e.* The Winter Rosselet. This is by some suppos'd to be the same Pear as is call'd the *Dry Martin*; but it is very different from that in several Particulars: The Colour of this is a greenish Yellow; the Stalk is long and slender, and the Flesh is buttery and melting, and generally full of Juice, which is very sweet, but the Skin is apt to contain an austere Juice; so that if it be not pared, it is apt to be disagreeable to many Persons Palates. It is in eating in January and February.

67. *PYRUS; sativa, Pictaviensis, fructu brumali, globoso, sessili, saccharato, odorato. Tourn.* Poire Portail, *i. e.* The Gate Pear. This Pear was discover'd in the Province of *Poitou*, where it was so much esteem'd, that they prefer'd it to most other Fruit; tho', in the Opinion of the most curious Judges, it does not deserve the great Character which is given to it, for it rarely happens that it proves good for eating, being generally dry, stony, and hard, unless in extraordinary Seasons, and upon a very good Soil. This must always be grafted on a free Stock, and should be planted on a light rich Soil, and in very dry Seasons the Trees should be water'd, otherwise the Fruit will be stony. It is in Season from January to March, and bakes well.

68. *PYRUS;*

68. *PYRUS; sativa, fructu brumali, magno, globoso, flavescente, punctis rufis conferso.* Tourn. Franc-real. It is also call'd *Fin-Or d'Hyver*, i. e. The Golden End of Winter. This is a very large Pear, almost of a globular Figure; the Skin is yellow, spotted with red; the Stalk is short, and the Wood of the Tree mealy: The Flesh of this Pear is dry, and very apt to be stony, but it bakes exceeding well, and continues good from January till March.

69. *PYRUS; sativa, fructu brumali, turbinato, sessili, subacido flavescente, punctis asperioribus conferso.* Tourn. Bergamote Bugi: It is also called *Bergamote de Pâque*, i. e. The Easter Bergamot. It is a large Pear, almost round, but is a little produc'd in Length towards the Stalk; the Eye is flat, and the Skin is green, having many rough Protuberances like Spots dispers'd all over, but as it ripens it becomes yellowish; the Flesh is breaking, and in a good Season the Juice is sweet, but it must have a free Stock, a South-East Wall, and a good Soil, otherwise it is apt to be stony and austere. It is in Eating from February till April.

70. *PYRUS; sativa, fructu brumali, magno, pyramidato, è flavo non nihil rubente.* Tourn. Bon-Chrétien d'Hyver, i. e. The Winter Bonchretien Pear. This Pear is very large and long, of a pyramidal Figure; the Skin is of a yellowish Colour, but the Side next the Sun inclines to a soft Red; the Flesh is tender and breaking, and is very full of rich sugar'd Juice. This is esteem'd in France one of the best Winter Pears, but in England it is seldom so good, tho' I am fully satisfy'd, if it were grafted on a free Stock, and planted in a good Soil, against a Wall expos'd to the South-East, and the Branches train'd at full Length, it might be render'd more acceptable than it is at present in England.

71. *PYRUS; sativa, fructu brumali, magno, Cydoniæ facie, partim flavo, partim purpureo.* Tourn. Catillac or Cadillac. This is a large Pear shap'd somewhat like a Quince; the Skin is for the most Part of a yellow Colour, but changes to a deep Red on the Side next the Sun: The Flesh is hard, and the Juice austere; but it is one of the best Fruits for Baking yet known, and being a plentiful Bearer, deserves a Place in every good Collection of Fruit. It will be good from Christmas to April, or longer.

72. *PYRUS; sativa, fructu brumali, oblongo, flavescente, punctis rubris conferso.* La Pastourelle. This Pear is of the Size and Shape of a fine *Rouffelet*; the Stalk is short and crooked; the Skin is somewhat rough, of a yellowish Colour, spotted with Red; the Flesh is tender and buttery; and when it grows on a dry Soil, the Juice is very sweet; but on a wet Soil, or in moist Years, it is subject to have an austere Taste. This Pear is in Eating in February and March.

73. *PYRUS; sativa, fructu brumali, sessili, partim flavescente, partim purpurascete.* Tourn. La double Fleur, i. e. The Double-flowering Pear. This is so call'd, because the Flowers

have a double Range of Petals or Leaves. It is a large short Pear, the Stalk is long and strait, the Skin is very smooth, and of a yellowish Colour, but the Side next the Sun is commonly of a fine red or purple Colour. This is by some esteem'd for eating, but 'tis generally too austere in this Country for that Purpose. It is the best Pear in the World for Baking or Composts. It is good from February to May.

74. *PYRUS; sativa, fructu brumali, oblongo, partim flavescente partim purpurascete.* St. Martial. It is also call'd in some Places *Poire Angelique*, i. e. The Angelick Pear. This Pear is oblong, and has a very long Stalk; the Skin is smooth and yellowish, but on the Side next the Sun, it turns to a purplish Colour; the Flesh is tender and buttery, and the Juice is very sweet. This is in Eating in February and March.

75. *PYRUS; sativa, fructu brumali oblongo, partim albido, partim purpureo, odorato saccharato.* La Poire de Chaumontelle, or Bess de Chaumontelle, i. e. The Wilding of Chaumontelle. This Pear is in Shape somewhat like the *Autumn Buerrè*, but is flatter at the Crown; the Skin is a little rough, of a pale green Colour, but turns to a purplish Colour next the Sun; the Flesh is melting, the Juice is very rich, and a little perfum'd. It is in Eating from March to June, and is esteem'd the best late Pear yet known.

76. *PYRUS; sativa, fructu brumali, globoso, sessili, cinereo, maculis amplis, obscurioribus conferso.* Tourn. Carmelite. This is a middle-siz'd Pear, of a roundish Form; the Skin is of a grey Colour on one Side, but is inclining to a Red on the other, having some broad Spots of a dark Colour all over; the Flesh is commonly hard and dry, so that it is not very much esteem'd. It is in Season in March.

77. *PYRUS; sativa, fructu brumali, maximo, pyramidato, dilute virente.* The Union Pear; otherwise call'd Dr. Uvedale's St. Germain. This is a very large long Pear, of a deep green Colour, but the Side next the Sun doth sometimes change to a Red as it ripens. This is not fit for eating, but bakes very well; and being a great Bearer and a very large Fruit, deserves a Place in every good Collection. It is in Season from Christmas to April.

There are many other Sorts of Pears which are still continu'd in some old Gardens, but as those here mention'd are the best Sorts known at present, so it would be needless to enumerate a great Quantity of ordinary Fruit, since every one who intends to plant Fruits, will rather chuse those which are the most valued, the Expence and Trouble being the same for a bad Sort of Fruit as a good one: Indeed I have inserted many more than are really worth planting, in order to please such who are fond of a great Variety; but whoever hath a Mind to make Choice of such only as are good, may easily distinguish them, by attending to the Account given of each Sort, and hereby every Person is at Liberty to please himself; for it is not every one who prefers a *Buerre Pear*, tho' that is generally esteem'd the

very best in its proper Season: There are some who admire the *Messire Jean*, for the Firmness of its Flesh, which to others is a great Objection against it; so that as some esteem the Breaking, and others the Melting *Pears*, I have distinguish'd them by their Descriptions in such a Manner that every one may make Choice of the Kinds of Fruits which are agreeable to their Palates; and the different Seasons in which each Kind is in eating, being exhibited, (allowing a little for the Difference of Seasons, which are earlier some Years than others) it is not very difficult for a Person to make a Collection of good *Pears* to succeed each other throughout the Season of these Fruits, both for Eating and Baking.

Pears are propagated by budding or grafting them upon Stocks of their own Kind, which are commonly call'd *Free-Stocks*, or upon *Quince-Stocks*, or *White-Thorn*; upon all which these Fruits will take; but the latter sort of Stock is now seldom used, because they rarely keep Pace in their Growth, with the Fruit budded or grafted upon them; as also because the Fruit upon such Stocks are commonly drier and more apt to be mealy than when they are upon *Pear-Stocks*. *Quince-Stocks* are greatly used in the Nurseries for all sorts of *Pears* which are design'd for Dwarfs or Walls, in order to check the Luxuriancy of their Growth, so that they may be kept within Compass better than upon *Free-Stocks*: But against the general Use of these Stocks, for all sorts of *Pears* indifferently, there are very great Objections: 1st, Because some sorts of *Pears* will not thrive upon these Stocks, but in two or three Years will decay, or at most will but just keep alive. 2^{dly}, All the Sorts of hard breaking *Pears* are render'd stony and good for little; so that whenever any of these Sorts are thus injudiciously rais'd, the Fruit, altho' the Kind be ever so good, is condemn'd as good for nothing by such as are not well acquainted with it, when the Fault is intirely owing to the Stock on which it was grafted. On the contrary, all melting buttery *Pears* are greatly improv'd by being upon *Quince-Stocks*, provided they are planted on a strong Soil; but if the Ground be very dry and gravelly, no sort of *Pear* will do well upon *Quince-Stocks* in such Places.

These general Directions being given, there is no Occasion to repeat any Part of the Method in which these Stocks are rais'd, and the Fruits budded or grafted thereon; which has been already mention'd under the Article of *Nurseries*.

The Distance which these Trees should be planted either against Walls or *Espaliers*, must not be less than twenty Feet; but if they are planted twenty-five Feet, it will be better; for if they have not Room to spread on each Side, it will be impossible to preserve them in good Order, (especially those on *Free-Stocks*) for the more these Trees are prun'd, the more they will shoot; and, as I before said, many Sorts of *Pears* do produce their Blossom-buds first at the Extremity of the former Year's Shoots, so that when they are shorten'd, the

Fruit will be cut away; and this cannot be avoided, where the Trees have not Room allow'd in their first planting.

The Manner of preparing these Trees for Planting, is the same as hath been directed for other Fruit-trees, viz. To cut off all the small Fibres from the Roots, and to shorten some of the longest Roots, and cut off all the bruis'd ones, or such as shoot downright: This being done, you should plant 'em in the Places intended at the before-mention'd Distance. The best Time to plant these Trees, (if upon a middling or dry Soil) is in *October*, leaving their Heads on till *Spring*, which should be fasten'd to the Walls or Stakes, to prevent the Wind from disturbing their Roots; and in the beginning of *March* their Heads should be cut off, in the Manner already directed for *Peaches* and other Fruit-trees; observing also to lay some Mulch upon the Surface of the Ground about their Roots when they are planted; as hath been several times already directed for other Trees.

The first *Summer* after planting, the Branches should be train'd to the Wall or *Espalier* (against which they are planted) in a horizontal Position, as they are produc'd without shortening of them; and the *Michaelmas* following these Shoots should be shorten'd down to five or six Eyes, in order to obtain a sufficient Quantity of Branches to furnish the lower Part of the Wall or *Espalier*: But when this is done, the Shoots ought not to be shorten'd unless where there is want of Branches to fill a Vacancy; for whenever the Shoots are stopp'd, it occasions the Buds immediately below the Cut, to send forth two or more Shoots, whereby there will be a Confusion of Branches, and rarely any Fruit is produc'd with this Management.

The Distance which the Branches of *Pears* should be train'd must be proportion'd to the Size of their Fruit: Such Sorts whose Fruit are small, may be allow'd five or six Inches; but the larger Sorts must not be less than seven or eight Inches asunder: If this be duly observ'd, and the Branches carefully train'd horizontally as they are produc'd, there will be no Occasion for so much cutting as is commonly practis'd on these Trees, which instead of checking their Growth, does, on the contrary, cause them to shoot the stronger.

It is very surprizing to read the tedious Methods which most of the Writers on Fruit-trees have directed for pruning of these Trees; for by their prolix and perplex'd Methods, one would imagine they had endeavour'd to render themselves as unintelligible as possible: And this I am sure may be affirm'd, that it is next to impossible for a Learner ever to arrive at any tolerable Skill in Pruning, by the tedious and perplex'd Directions which are publish'd by Monsieur *Quintiney*, and those who have copied from him; for these have all set out wrong in the Beginning, by allowing their Trees less than half the Distance at which they should be planted; and then have prescribed Rules to keep them within that Compass, which is what cannot be effected, where

where Persons are desirous of having Plenty of Fruit.

I shall therefore only lay down a few necessary Directions for the Pruning and Managing of these Trees, which shall be done in as few Words as possible, that a Learner may the more easily understand it, and which (together with proper Observations) will be sufficient to instruct any Person in the right Management of them.

Pear-trees do generally produce their Blossom-buds first at the Extremity of the last Year's Shoots, so that if these are shorten'd, the Blossoms are cut off: But this is not all the Damage, for (as I before said) this occasions the Buds immediately below the Cut to put forth two or more Shoots, whereby the Number of Branches will be increas'd, and the Tree crowded too much with Wood; besides, those Buds which by this Management do produce Shoots, would have only produced *Curfons* and *Spurs*, upon which the Blossom buds are produced, if the leading Branch had not been shorten'd; therefore these should never be stopped, unless to furnish Wood to fill a Vacancy.

It is not necessary to provide a new Supply of Wood in *Pear-trees*, as must be done for *Peaches*, *Nectarines*, &c. which only produce their Fruit upon young Wood; for *Pears* do produce their Fruit upon *Curfons* or *Spurs*, which are produced upon Branches which are three or four Years old, which *Curfons* do continue fruitful many Years; so that where these Trees have been skilfully managed, I have seen Branches which have been train'd horizontally, upwards of twenty Feet from the Trunk of the Tree, and have been fruitful their whole Length. And if we do but carefully observe the Branches of a healthful Standard Tree, which has been permitted to grow without Pruning, we shall find many that are ten or twelve Years old, or more, which are very full of these *Curfons*, upon which is annually a good Number of Fruit produced.

During the *Summer* Season these Trees should be often look'd over, to train in the Shoots as they are produced, regularly, to the Wall or *Espalier*, and to displace fore-right and luxuriant Branches as they shoot out, whereby the Fruit will be equally expos'd to the Air and Sun, which will render them more beautiful, and better tasted, than when they are shaded by the Branches; and by thus managing the Trees in *Summer*, they will always appear beautiful, and in *Winter* they will want but little Pruning.

Where *Pear-trees* are thus regularly trained, without stopping of their Shoots, and have full Room for their Branches to extend on each Side, there will never be any Occasion for disbarking of the Branches, or cutting off the Roots, (as hath been directed by several Writers on Gardening) which Methods, however they may answer the Intention for the present, yet will certainly greatly injure the Trees, as must all violent Amputations, which should ever be avoided, as much as possible,

on Fruit-trees; and this, I am sure, can never be wanted, where Trees have been rightly planted, and regularly trained, while young.

The Season for pruning of these Trees, is any time after the Fruits are gathered, until the Beginning of *March*, but the sooner it is done, after the Fruit is gathered, the better, for Reasons already given for pruning of *Peach-trees*; though indeed, the deferring of these until *Spring*, where there are large Quantities of Trees to prune, is not so injurious to them, as to some more tender Fruits.

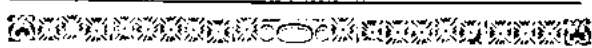
All the Sorts of *Summer Pears* will ripen very well, either on Standards, Dwarfs, or *Espaliers*; as will all the *Autumn Pears*, upon Dwarfs or *Espaliers*: But where a Person is very curious in his Fruit, I would always advise the Planting them against *Espaliers*, in which Method they take up but little Room in a Garden, and if they are well managed, do appear very beautiful, and the Fruit is larger and better tasted than those produced on Dwarfs, as hath been already observed. But all the Sorts of *Winter Pears* must be planted against East, South-East, or South-West Walls, otherwise they seldom ripen well in England.

In the Gathering of *Pears* great Regard should be had to the Bud which is formed at the Bottom of the Footstalk, for the next Year's Blossoms, which by forcing off the *Pear*, before it be mature, is many times spoiled; for during the Time the Fruit is growing, there is always a Bud formed by the Side of the Footstalk, upon the same Spur for the next Year's Fruit; so that when the *Pears* are ripe, if they are gently turned upwards, the Footstalk will readily part from the Spur without injuring of the Bud.

The Season for gathering all *Summer Pears* is just as they ripen, for none of these will remain good above a Day or two after they are taken from the Tree; nor will many of the *Autumn Pears* keep good above ten Days or a Fortnight after they are gathered. But the *Winter* Fruits should hang as long upon the Trees as the Season will permit; for they must not receive the Frost, which will cause them to rot, and render their Juices flat and ill-tasted; but if the Weather continues mild until the Middle of *October*, it will then be a good Season for gathering them in, which must always be done in dry Weather, and when the Trees are perfectly dry.

In the doing of this you ought carefully to avoid bruising them, therefore you should have a broad, flat Basket to lay 'em in as they are gathered; and when they are carried into the Store-Room, they should be taken out singly, and each Sort laid up in a close Heap, on a dry Place, in order to sweat, where they may remain for eight or ten Days, during which Time the Windows should be open, to admit the Air, in order to carry off all the Moisture which is perspired from the Fruit; after this, the *Pears* should be taken singly, and wiped dry with a woollen Cloth, and then pack'd up in close Baskets, observing to put some sweet

sweet Wheat Straw in the Bottoms and round the Sides of the Baskets, to prevent their bruising against the Basket; you should also observe to put but one Sort of Fruit into a Basket, lest by their different Fermentations, they should rot each other; but if you have enough of one Sort to fill a Basket which holds two or three Bushels, it will be still better. After you have fill'd the Baskets, you must cover them over with Wheat Straw very close, and fasten them down, then place these Baskets in a close Room, where they may be kept dry, and from Frost, but the less Air is let into the Room, the better the Fruit will keep: It will be very necessary to fix a Label to each Basket, denoting the Sort of Fruit therein contained, which will save the Trouble of opening them, whenever you want to know the Sorts of Fruit; besides, they ought not to be opened before their Season to be eaten, for the oftner they are opened and exposed to the Air, the worse they will keep. I don't doubt but this will be objected to by many, who imagine Fruit can't be laid too thin, for which Reason they make Shelves to dispose them singly upon, and are very fond of admitting fresh Air, whenever the Weather is mild, supposing it very necessary to preserve the Fruit; but the contrary of this is found true, by those Persons who have large Stocks of Fruit laid up in their Store-Houses in London, which remain closely shut up for several Months, in the Manner before related; and when these are opened, the Fruit is always found plumper and sounder than any of those Fruits which were preserved singly upon Shelves. For, as Mr. Boyle observes, the Air is the Cause of Putrefaction, and in order to prove this, that honourable Person put Fruits of several Kinds into Glasses where the Air was exhausted, in which Places they remained sound for several Months, but upon being expos'd to the Air, did rot in a very short Time; which plainly shews the Absurdity of the common Method now used to preserve Fruit.



Q U

QUAMOCLIT, [it is an Indian Name] Bindweed.

The Characters are;

The Flower consists of one Leaf, shaped like a Funnel, and divided at the Top into several Segments; from the Flower-cup rises the Pointal, which afterwards becomes a roundish Fruit, inclosing several oblong Seeds.

We have but one Species of this Plant in England, which is,

QUAMOCLIT; foliis tenuiter incis & pennatis. Tourn. Quamaclit with very fine, cut, winged Leaves, commonly called in Barbadoes, Sweet-William.

This Plant is very common in Jamaica, Barbadoes, and the Caribbee Islands, where it climbs upon Bushes, Hedges, or whatever grows near it, and produces great Quantities of beautiful Scarlet Flowers, almost of the Figure of a small Convolvulus Flower, but the Tube being much larger, and the Seeds being of a different Figure from those of the Convolvulus, Monsieur Tournesort hath separated it from that Genus. The Seeds of this Plant are generally brought into England every Spring, from the West-Indies: They should be sown on a Hot-bed in March, and when the Plants are come up, they must be planted each into a small Pot, fill'd with light sandy Earth, and plunged into a fresh Hot-bed, to bring the Plants forward: As the Plants advance in Height, so they should be removed into larger Pots, and Sticks placed down by them, for 'em to climb upon; they must also be removed to a fresh Hot-bed, when the old one has lost its Heat; and when the Plants are too high to be contain'd under Frames, they should be removed into the Stove, where, if they are plunged into a moderate Hot-bed of Tanners Bark, and not too much drawn, they will produce a great Quantity of beautiful Scarlet Flowers, and ripen their Seeds very well; but if they are expos'd to the open Air, they seldom flower in this Country. This Plant continues but one Year, the Root perishing soon after the Seeds are ripe.

QUERCUS, [so call'd of *κέρχω*, to make rough; because of the Roughness of its Bark.] The Oak-Tree.

The Characters are;

It hath Male Flowers (or Katkins) which consist of a great Number of small slender Threads; the Embryo's, which are produced at remote Distances from these, on the same Tree, do afterwards become Acorns, which are produced in hard, scaly Cups: To which may be added, the Leaves are sinuated.

The Species are;

1. **QUERCUS**; *latifolia*. Park. Theat. The common Oak.

2. **QUERCUS**; *latifolia*, mas, quæ brevi pediculo est. C. B. P. Oak with the Acorns on short Footstalks.

3. **QUERCUS**; *latifolia*, foliis ex albo elegantè variegatis. The strip'd Oak.

4. **QUERCUS**; *latifolia*, perpetuo virens. C. B. P. The broad-leav'd ever-green Oak.

5. **QUERCUS**; *calice echinato*, glande majore. C. B. P. Oak with large Acorns having prickly Cups.

6. **QUERCUS**; *humilis*, Gallis binis, ternis aut pluribus simul junctis. C. B. P. Dwarf Oak, vulgò.

7. **QUERCUS**; *Virginiana*, rubris venis muricata. Pluk. Phyt. The Virginian Scarlet Oak.

8. **QUERCUS**; *Pastanæ foliis*, procera Arbor, Virginia. Pluk. Phyt. Virginian Oak with Chesnut Leaves.

9. **QUERCUS**; *alba*, Virginia. Park. Theat. The white or iron Oak of Virginia.

10. **QUERCUS**;

10. QUERCUS; *Virginiana, salicis longiore folio, fructu minimo*. Pluk. *Amaltib.* Virginian willow-leav'd Oak.

11. QUERCUS; *pumilis, Castanea folio, Virginienfis.* Pluk. *Almag.* The Chinquapin Oak.

The two first Sorts are common in *England*, but the Sort whose Acorns grow on short Footstalks, is less frequent than the other. I have seen several Trees of that Kind near *Dulwich* in *Surrey*, but whether the Acorns of this Sort will produce Trees of the same Kind, I cannot determine. The Sort with strip'd Leaves was obtain'd by Accident, but may be propagated by budding or grafting it upon the common Oak; the Leaves of this are generally variegated with white in a most beautiful Manner, and the Tree is esteem'd a great Curiosity by such as delight in variegated Plants.

The fourth Kind deserves a Place in *Wildernesses*, amongst other Sorts of ever-green Trees, where it will make a beautiful Appearance, but the Timber is not near so good as that of the common Sort.

The fifth Kind was originally brought into *England* from *Spain*, but is hardy enough to endure the Cold of our Winters very well: This is preserved by such as are curious in collecting the several Kinds of Trees.

The other Sorts have been brought from *America*, (where there are a Variety of different Oaks) and are very hardy: Many of them are of quicker Growth than the common Sort, and although their Timber is not so good, yet they deserve a Place in large *Wildernesses*, where they will afford an agreeable Variety. As these Trees are propagated from Acorns, so those Persons who are desirous to cultivate 'em, should endeavour to obtain the Acorns fresh from *America*, which must be put up in Sand, to preserve them during their Passage; and when they arrive in *England*, they should be put into the Ground immediately, otherwise they do seldom grow.

Besides the Sorts of Oaks here-mentioned, there are divers others which are produced in several Parts of *Europe*, and differ in the Shape and Size of their Leaves and Fruit; but these are not to be found in any of our *English* Plantations at present; though, when I was at *Leyden* in *Holland*, in the Year 1727, I saw above forty Sorts of Oaks, in the curious Garden of the learned Dr. *Boerhaave*, near *Leyden*, most of which were in a very prosperous Condition, and had endured the Cold of that Climate two or three Years, in the open Air; so that if these were procured in *England*, they would be equally as hardy as the common Sort, and add to the Variety of our Plantations.

All the Sorts of Oaks are propagated from Acorns, which should be sown as soon as possible, when they are ripe; for if they are kept long out of the Ground, they seldom grow.

The Manner of sowing these Acorns (if designed for a small Plantation, to be removed) is, to prepare a Bed or two of fresh Earth, neither too strong and heavy, nor too

light and dry; in these Beds you should place the Acorns about two Inches asunder, covering them about two Inches thick, with the same fresh Earth, observing to leave none of them uncovered, to entice the Vermin, which may, in a short Time, destroy all the Seeds.

In the *Spring*, when the Plants begin to appear, you must carefully clear them from Weeds, and if the Season proves dry, you should refresh them now and then with a little Water, which will greatly promote their Growth. In these Beds the Plants should remain until the following *Spring*, (observing constantly to keep 'em clear from Weeds) at which Time you should prepare a Spot of good fresh Earth, (in Size proportionable to the Quantity of Plants) which should be well trenched and levelled; then toward the Middle or latter End of *March*, you should carefully take up the Plants, so as not to injure their Roots, and plant them out in Rows three Feet asunder, and eighteen Inches Distance Plant from Plant, observing never to suffer the Plants to abide long out of the Ground, because their Roots would dry and endanger the Growth of the Plants.

When they are planted you should lay a little Mulch upon the Surface of the Ground, near their Roots, to prevent the Earth from drying too fast; and if the Season be very dry, you should give them a little Water, to settle the Earth to their Roots.

If these Things are carefully observed, there will not so many of the Plants miscarry, as do generally in the common Method: For few Persons consider either the proper Method or Season for removing these Trees; most People imagining it may be perform'd with equal Success, any time after the Leaves begin to decay: but this is a very wrong Opinion; for, from several Experiments which I have made, in transplanting of these Trees in various Seasons, I find they always succeed best when they are transplanted just before they begin to shoot; at which Season there will very few fail, provided they are removed with Care.

When the Plants have taken Root in this Nursery, they will require little more Care than to keep 'em clear from Weeds, and dig the Ground between the Rows every *Spring*; in doing of which you should cut off such Roots as extend very far from the Trunk of the Trees, which will render them better for transplanting again: You should also prune off such Side-Branches as do extend themselves very far, and would retard the upright Shoot, but you should by no means cut off all the small lateral Branches, some of which are absolutely necessary to be left on, to detain the Sap for the Augmentation of the Trunk; for I have often observed, where Trees have been thus closely pruned, that their Heads have over-grown their Bodies, so that they have bent downward, and become crooked.

When these Trees have remain'd in the Nursery three or four Years, they will then be large enough to transplant to the Places where they are to remain; for it is not proper to

let them grow very large before they are planted out, because these are very hazardous Trees to remove when old, or after they have taken deep Root.

The Season for this Work is (as I said) just before they begin to shoot in the *Spring*, at which Time, if they are carefully taken up, there will be little Danger of their succeeding. When they are planted, the Surface of the Ground should be mulched about their Roots, to prevent its drying too fast; and if the Season is very dry, they should be watered, to settle the Earth to their Roots, which may be repeated two or three times in very dry Weather, but you must carefully avoid giving them too much Water, which is very injurious to these Trees, when newly removed.

You should also stake them, to prevent their being shaken and disturb'd by the Winds, which would retard their Rooting. In transplanting of these Trees, you should by no means cut their Heads, which is too much practis'd; all that should be done, must be only to cut off any bruised, or ill-placed Branches, which should be taken off close to the Place where they are produced; but there can be no greater Injury done to these Trees, than to shorten their Shoots; for when the leading Bud (which is absolutely necessary to draw and attract the Nourishment) is taken off, the Branch often decays entirely, or at least down to the next vigorous Bud.

The Trees thus rais'd and manag'd, will (if planted in a proper Soil) grow to a considerable Magnitude, and are very proper for a Wilderness in large Gardens, or to plant in Clumps in Parks, &c. but if they are design'd for Timber, it is by much the better Method to sow the Acorns in the Places where they are to remain; in order to which, you should provide your self in *Autumn* with a sufficient Quantity of Acorns, which should be always taken from strait, upright, vigorous growing Trees: these should be gathered from under the Trees as soon as may be, after they are fallen, and, if possible, in a dry Time, laying them thin in some open Room to dry; after which they may be put up in dry Sand, and preserved in a dry Place until the End of *January*, when you should prepare the Ground for planting them.

The Manner of doing this, when the Plantation is very large, should be, to dig square Spots about two Feet over, at every ten Feet Distance, into each of which you should put four or five sound Acorns, about two Inches deep, being careful to cover them all over, lest by leaving any of them above Ground, the Vermin should be enticed, and thereby the greatest Part of the Plantation should be destroy'd. When the whole Plantation is finished, it will be of great Service to stick into each Plot a few small Bushes, which will protect the Plants when they appear above Ground, from Cattle, and also from the Injury of Weather; and when the Plants are come up, the Weeds should be carefully clean'd away from them during the growing Season, which will greatly promote their Growth; and the following

Spring, just before the Plants begin to shoot, you should take them all up, except two of the most thriving out of each Plot (which may be transplanted into another Place, if you have occasion for them); but in doing of this, you should be very careful not to disturb the Roots of the remaining Plants; and it will be very necessary to renew the Bushes about them where they are lost, to protect them from Cattle; and the following *Summer* they should be kept clear from Weeds.

In this manner they may remain three or four Years (observing every *Spring* to dig and loosen the Earth about their Roots, which will be of great Service to them) by which time you will easily judge which of the two Plants left in each Plot, is likely to make the best Tree, so that the other should now be taken away, being very careful how you dig near the remaining Plants, lest you should injure their Roots; and if at this time you find any of them with very crooked unsightly Stems, you may cut them down near the Surface of the Ground, and if their Roots are strong, they will send forth strait vigorous Shoots the following *Summer*, and make kindly handsome Plants.

When these Plants are advanced out of the Reach of Cattle, they will require but little more Care, except to prune off any strong lateral Branches, where they are produced, in order to strengthen the leading Shoot; but you should by no means be too busy in pruning these Trees, which will greatly retard their Growth. The Expence of such Plantations is but small, especially where Labour is cheap, and the Profits which must arise from them, to the Successors of those who are so beneficent to their Posterity, as to lay out a small Share of their Fortune this Way, will be very great; but as this has been fully treated of by the eminent Mr. *Evelyn*, so I shall not repeat it in this Place, but refer the Curious to his valuable Treatise of *Forest-Trees*, where they will find enough said to encourage all Gentlemen of Estates, to lay out some of their present Fortune, to enrich their Families.

QUICK, delights in a Ground that is more dry than wet, (for watery Places it abhors.) Plant *Quick* in the following Manner:

Let the first Rows of Sets be plac'd in a Trench of about half a Foot deep, even with the Top of the Ditch, in somewhat a sloping or inclining Posture; then having rais'd the Bank near a Foot upon them, plant another Row so as their Tops may just peep out over the Middle of the Spaces of the first Row: These cover again to the Height and Thickness of the other, and place a third Rank opposite to the first, and then finish the Bank to its intended Height.

The Distances of the Plants should not be above one Foot; and the Season to do the Work in, may be from the Beginning of *February* till the End of *March*, or else in *September* to the Beginning of *December*.

When this is finish'd, you must guard both the Top of the Bank, and the outmost Verge of the

the Ditch with a sufficient dry Hedge interwoven from Stake to Stake into the Earth (which commonly they do on the Bank) to secure the *Quick* from the Spoil of Cattle.

You must also be careful to repair such as decay, the following Spring, by supplying the dead, and trimming the rest; and after three Years Growth, intermix some Timber trees amongst them, such as *Oak*, *Ash*, *Beech*, *Maple*, *Fruit* or the like; which being drawn young out of the Nurseries may be very easily inserted.

Some, indeed, object against scattering these Mafts and Keys among Fences; which being grown, over-top the Hedge that grows under it, and may prejudice it with their Shade and Drip: But this may be prevented by planting *Hollies* (which are Proof against these Impediments) in the Line or Trench where you would raise Standards, as far as they usually spread in many Years, and which, if plac'd at good Distances, how close soever to the Stem, would (besides their stout Defence) prove a great Decoration to large and ample Inclosures.

In *February* or *October*, with a sharp Hand-bill, cut away all superfluous Sprays and Stragglers; then search out the principal Stems, and with a keen and light Hatchet cut them slant-wise close to the Ground hardly three-quarters through, or rather so far only as till you can make them comply handsomely, lest you rift the Stem, and so lay it from you sloping as you go, folding in the lesser Branches which spring from them; and ever within five or six Feet Distance, where you find an upright Set, (cutting off only the Top to the Height of your intended Hedge) let it stand as a Stake, to fortify your Work, and to receive the twining of those Branches about it.

Lastly, at the Top, (which should be about five Feet above Ground) take the longest, most slender and flexible Twigs which you reserv'd, and (being cut as the former, where Need requires) bind in the Extremities of all the rest; and thus your Work is finish'd.

This being done very close and thick, makes an impregnable Hedge in few Years, for it may be repeated as you see Occasion; and what you so cut away, will help to make your dry Hedges for your young Plantations, or will be useful for the Oven, and make good *Bavin*, especially the extravagant Side-branches which will spring upright, till the newly-wounded are healed.

There are some who would have no Stakes cut from the Trees, save here and there one, so as to leave half the Head naked, and the other standing, but the over-hanging Boughs will kill what is under them and ruin the Tree, so pernicious is this Half-topping.

There is nothing more prejudicial to undergrowing young Trees than when newly trimmed and pruned, to have their (as yet raw) Wounds poison'd with continual dripping.

For Stakes in this Work, *Oak* is to be preferr'd, tho' some will use *Alder*, but it is

not good; or the *Black-thorn*, *Crab-tree*: In Moorish-ground, *Witby*, *Ash*, *Maple*, *Hazel*, (which some make Hedges of; but being subject to the Browning of Cattle, when the young Shoots appear, it does better in Copfes) these not lasting, should yet be drove well in at every Yard of Interval, both before and after they are bound, till they have taken the hard Earth, and are very fast; and even your plashed Hedges need some small Thorns to be laid over to protect the Shoots from Cattle and Sheep till they are somewhat fortify'd; and the doubler the Winding is lodg'd the better, which should be beaten and forc'd down together with the Stakes as equally as may be.

Note, That in sloping your Windings, if it be too low done (as very usually) it frequently mortifies the Tops, therefore it ought to be so bent as it may not impede the mounting of the Sap.

If the *Plash* be of an extraordinary Age, wind it at the nether Boughs all together and cutting the Sets, as directed, permit it rather to hang downwards a little than to rise too forward, and then twist the Branches into the Work, leaving a Set free and unconstrain'd at every Yard-space, besides such as will serve for Stakes, abated to about five Feet Length, (which is a competent Stature for a Hedge) and so let it stand.

One shall often find in this Work, especially in old neglected Hedges, some great Trees or Stubs, that commonly make Gaps for Cattle: Such should be cut so near the Earth, as till you can lay them athwart, that the Top of one may rest on the Root or Stub of the other as far as they extend, stopping the Cavities with its Boughs and Branches: And thus a Hedge, which seems to consist of nothing but scrubby Trees and Stumps, may be reduc'd to a tolerable Fence; but in case it be superannuated, it is adviseable to stub all up, and quite to renew it.

Thomas Franklin, Esq; has given the following Account of his Method of planting *Quick*.

He first set out the Ground for Ditches and *Quick* ten Feet in Breadth; he subdivided that, by marking out two Feet and a half on each Side (more or less at Pleasure) for the Ditches, leaving five in the Middle between them; then digging up two Feet in the Midst of that five Feet, he planted the Sets in; which although it required more Labour and Charge, he says, he soon found it repaid the Cost: This done, he began to dig the Fosses, and to set up one Row of Turfs on the Outside of the said five Feet; namely, one Row on each Side thereof, the green Side outmost, a little reclining, so as the Grass might grow.

After this, returning to the Place he began at, he order'd one of the Men to dig a Spit of the under Turf-mould, and lay it between the Turfs placed edgewise as before describ'd, upon the two Feet which was purposely dug in the Middle, and prepar'd for the Sets, which the Planter sets with two *Quicks* upon the Surface of the Earth almost upright, whilst another

another Workman laid the Mould forwards about twelve Inches, and then set two more, and so continued.

This being finish'd, he order'd another Row of Turfs to be placed on each Side upon the Top of the former, and fill'd the Vacancy between the Sets and Turfs as high as their Tops, always leaving the Middle, where the Sets were planted, hollow, and somewhat lower than the Sides of the Banks by eight or ten Inches, that the Rain might descend to their Roots; which is of great Advantage to their Growth, and by far better than by the old Ways, where the Banks are too much sloping, and the Roots of the Set are seldom wetted even in a moist Season the Summer following: But if it prove dry, many of the Sets, especially the late planted, will perish; and even few of those that had been planted in the latter End of April, (the Summer happening to be somewhat dry) escap'd.

The Planting being thus advanc'd, the next Care is *Fencing*; by setting a Hedge of about twenty Inches high upon the Top of the Bank on each Side thereof, leaning a little outwards from the Sets, which will protect them as well (if not better) than a Hedge of three Feet, or four Inches more, standing on the Surface of the Ground, which being rais'd with the Turfs and Sods about twenty Inches, and the Hedge about twenty Inches more, will make three Feet four Inches; so as no Cattle can approach the dead Head to prejudice it, unless they set their Feet in the Ditch it self, which will be at least a Foot deep; and from the Bottom of the Foss to the Top of the Hedge, about four Feet and a half, which they can hardly reach over to crop the *Quick*, as they might in the old Way; and besides, such an Hedge will endure a Year longer.

He says, he had an Hedge which had stood five Years. And tho' nine or ten Feet were sufficient for both Ditches and Banks, yet where the Ground is but indifferent, it is better Husbandry to take twelve Feet, which will allow of a Bank at least six Feet broad, and gives more Scope to place the dead Hedges farther from the Sets, and the Ditches being shallow, will, in two Years time, graze.

As to the Objection, that taking twelve Feet wastes too much Ground, he affirms, That if twelve Feet in Breadth be taken for a Ditch and Bank, there will no more Ground be wasted than by the common Way; for in that a *Quick* is rarely set but there is nine Feet between the dead Hedges, which is intirely lost all the time of fencing; whereas with double Ditches there remain at least eighteen Inches on each Side where the Turfs were set on edge, that bear more Grass than when it lay on the flat.

But admitting it did totally lay waste three Feet of Ground, the Damage were very considerable, since forty Perch in Length, two hundred and twenty Yards, which makes Perches 7, 25", 9', or 7 Pole $\frac{1}{2}$; which, at 13s. and 4d. the Acre, amounts not to 7d. $\frac{1}{2}$ per Annum.

Now that this is not only the best but cheapest Way of *Quick-setting*, will appear by comparing the Charge of both.

In the usual Way, the Charge of a three Foot Ditch is four Pence per Pole, the Owner providing Sets; if the Workman finds them, he will have for making the said Ditch, and setting them, eight Pence per Pole, and for Hedging, two Pence, that is, for both Sides four Pence the Pole; which renders the Charge of Hedging, Ditching, and Sets, twelve Pence the Pole, that is, for forty Rod in Length forty Shillings.

Then one Load of Wood out of the Copse costs (with the Carriage, tho' but two or three Miles Distance) ten Shillings, which will seldom hedge above eight Pole (single Hedge); but allowing to do ten, to fence forty Pole, there must be at least eight Load of Wood, which costs four Pounds, making the whole Expence for Ditching, Fencing and Setting forty Pole, to be six Pounds, reckoning with the least; for scarce any will undertake to do it for less than three Shillings and six Pence per Pole, and then the forty Pole costs seven Pounds.

Whereas with double Ditches, both of them *Setting* and *Sets*, will be done for eight Pence the Pole, and the Husbandman get as good Wages as with the single Ditch, (for though the Labour about them is more, yet the making the Table is sav'd) which costs one Pound six Shillings and eight Pence; and the Hedges being low, they will make better Wages at Hedging for a Penny a Pole, than at two Pence for common Hedges; which comes to six Shillings and eight Pence; for hedging forty Pole on both Sides; Thus, one Load of Wood will fence thirty Pole at least, and forty hedged with two Thirds of Wood less than in the other Way, and cost but one Pound six Shillings and eight Pence, which makes the other whole Charge of Sets, Ditching, Fencing, and Wood but three Pounds.

QUICK BEAM; *vide* Sorbus Sylvestris.

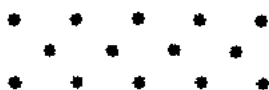
QUINCE TREE; *vide* Cydonia.

QUINCUNX ORDER; is a Plantation of Trees, dispos'd originally in a Square, consisting of five Trees, one at each Corner, and a fifth in the Middle; which Disposition repeated again and again, forms a regular Grove, Wood or Wilderness: and when view'd by an Angle of the Square or Parallelogram, presents equal or parallel Alleys.

Or the *Quincunx* is the Figure of a Plantation of Trees, dispos'd in several Rows, both length and breadthwise, in such manner, that the first Tree of the second Row commences in the Center of the Square form'd by the two first Trees of the first Row, and the two first of the third, resembling the Figure of the *Five at Cards*; the finest manner of planting Trees to form a Grove.

Trees

Trees planted in *Quincunx*, are such as are planted in the following Form :



QUINQUEFOLIUM; [is so called, of *quinque*, five, and *folium*, Lat. a *Leaf*, because this Plant bears five Leaves upon one Stalk. It is call'd *Pentaphyllum*, of *πέντε* five, and *φύλλον* a *Leaf*, i.e. a *Plant having five Leaves*.] Cinquefoil.

There are many *Species* of this Plant which are preserv'd in *Botanick Gardens*, for Variety, (some of which grow wild in divers Parts of *England*) but as they are never propagated either for Use or Beauty, so I shall not trouble the Reader with an Enumeration of their several Names.



R A

RACEMIFEROUS, signifies bearing in Clusters.

RACEMUS, a *Cluster*; is a Stalk divided or branched into several Footstalks, sustaining the Flowers or Fruits thick set together; as are the Bunches of *Grapes*, *Currants*, &c. The first of these Conditions distinguishes it from a Spike; the last from a Panicle.

RADIATED FLOWERS, are such as have several Semiflorets set round a Disk, in Form of a radiant Star; as are the Flowers of *Daizy*, *Camomil*, &c. These are called *Radiated discous Flowers*. Those which have no such Ray, are call'd *Naked discous Flowers*, as the *Wormwood*, *Mugwort*, *Tansy*, &c.

RADICLE, denotes that Part of the Seed of a Plant, which upon its Vegetation becomes a little Root, by which the tender Plant at first receives its Nourishment before the after-Root is form'd. This is that part of the Seed, which in making *Malt* shoots forth, and is call'd the *Come* or *Comb*.

RADISH; *vide* *Raphanus*.

RADISH, HORSE; *vide* *Cochlearia*.

RAIN is generally accounted to be a crude Vapour of the Earth, but more especially of the Sea, drawn up from thence by the attractive Power of the Sun, or carry'd thitherward by Pulsion, and wafted by the Winds into the *Aerial Region*; by which Sublimation and Rarefaction, and the virtual Qualities of the Sun and Air, it is form'd into Clouds.

The Crudities are dispell'd, and these Clouds suspend and hang in the Air; and tho' it may be thought impossible that they should be so suspended in the Air, by reason of their

great Weight and Pressure, yet it will not appear so, on Consideration.

When these Vapours are thus drawn up to any considerable Height, the Strength of the Air which is underneath them, and which still grows greater and greater, and by its Motion undulating this way and that way, they rise gradually through the Air.

This is demonstrable by Paper Kites, which after they are rais'd to about sixty Feet high, do rise easier and with greater Swiftness, and the higher, still the better and stronger they fly.

These Clouds being thus arriv'd into the upper *Region* of the *Air*, they are soon aggregated and condens'd into Baxies and Clouds.

And tho' they are blown here and there, they are still suspended, till they are released from their Imprisonment by the genial Disposition of the Sun, or by the natural Warmth, Humidity and Rarefaction of the Air.

It is not to be doubted, but that *Rain* drops out of the Clouds; because we don't find it rain, but where Clouds are to be seen; and by how much the fairer the Weather is, the seldomer it rains.

Rain is a very frequent and useful Meteor; descending from above in Form of Drops of Water.

Rain seems to differ from Dew only in this, that Dew falls at some particular Times, and in very small Drops, so as to be seen when it is down; but is scarce perceivable while it is falling, whereas *Rain* is grosser, and falls at any time.

Rain is apparently a precipitated Cloud, as Clouds are nothing but Vapours, raised from Moisture, Waters, &c. and Vapours are demonstratively nothing else but little Bubbles, or *Vesiculæ*, detach'd from the Waters, by the Power of the solar or subterraneous Heat, or both.

These *Vesiculæ* being specifically lighter than the Atmosphere, are buoyed up thereby till they arrive at a Region, where the Air is a just Ballance with them; and here they float, till by some new Agent, they are converted into Clouds, and thence, into either *Rain*, *Snow*, *Hail*, *Mist*, or the like.

But the Agent in this Formation of Clouds, &c. is a little controverted: The Generality will have it the *Cold*, which constantly occupying the superior Regions of the Air, chills and condenses the *Vesiculæ*, at their Arrival from a warmer Quarter, congregates them together, and occasions several of them to coalesce into little Masses; by this Means their Quantity of Matter increasing in a greater Proportion than their Surface, they become an Over-load to the lighter Air, and descend into *Rain*.

The Coldness of the *Air* may cause the Particles of the Clouds to lose their Motion, and become less able to resist the Gravity of the incumbent Air, and consequently to yield to its Pressure and fall to the Ground.

Mr. *Derham* accounts for the Precipitation hence, That the *Vesiculæ* being full of Air, when they meet with a colder Air than that

they contain, their Air is contracted into a less Space, and consequently their watry Shell or Case rendered thicker, so as to become heavier than the Air, &c.

Others only allow the Cold a Part in the Action, and bring in the Winds as Sharers with it: Indeed it is clear, that a Wind blowing against a Cloud, will drive its *Vesiculae* upon one another, by which Means several of them coalescing as before, will be enabled to descend, and the Effect will still be more considerable, if two opposite Winds blow towards the same Place. Add to this, that Clouds already form'd, happening to be aggregated by fresh Accessions of Vapour continually ascending, may thence be enabled to descend.

The Wind may collect the Vapours in such abundance, as first to form very thick Clouds, and then to squeeze those Clouds together, till the watery Particles make Drops too big to hang in the Air.

But the grand Cause, according to Monsieur *Robault*, is still behind; he conceives it to be the Heat of the Air, which after continuing for some time near the Earth, is at length carried up on high by a Wind, and there thawing the frozen *Villi* or Flocks of the half-frozen *Vesiculae*, reduces them into Drops, which coalescing, descend, and have their Dissolution perfected in their Progress through the lower and warmer Stages of the Atmosphere.

M. *Le Clerc* and others, ascribe this Descent of the Clouds rather to an Alteration of the Atmosphere than of the *Vesiculae*, and suppose it to proceed from a Diminution of the Spring or elastick Force of the Air.

This Elasticity which depends chiefly, or wholly, upon the dry, terrene Exhalations being weakened, the Atmosphere sinks under its Burthen; and the Clouds fall upon the common Principle of Precipitation.

Now the little *Vesiculae*, by any or all of these Means, being once upon the Descent, will persist therein, notwithstanding the Increase of Resistance they every Moment meet withal in their Progress through still denser and denser Parts of the Atmosphere.

For as they all tend towards the same Point, viz. the Centre of the Earth, the farther they fall, the more Coalitions will they make, and the more Coalitions, the more Matter there will be under the same Surface, the Surface only increasing as the Squares, but the Solidity as the Cubes; and the more Matter under the same Surface, the less Friction or Resistance there will be to the same Matter.

Thus if the Cold, the Wind, &c. happen to act early enough to precipitate the *Vesiculae*, ere they are arrived at any considerable Height, the Coalitions being few in so short a Descent, the Drops will be proportionably small; and thus is form'd what we call *Dew*.

If the Vapours prove more copious, and rise a little higher, we have a *Mist* or *Fog*.

A little higher still, and they produce a small *Rain*.

If they neither meet with Cold or Wind enough to condense or dissipate them, they

form a heavy, thick, dark Sky, which lasts sometimes several Weeks.

Hence we may account for many of the Phenomena of the Weather, e.g. Why a cold, is always a wet Summer, and a warm, a dry one; because the Principle of Precipitation is had in the one Case, and wanting in the other.

Why we have ordinarily most Rain about the Equinoxes; because the Vapours arise more plentifully than ordinary in the Spring, as the Earth becomes loosened from the brumal Constipations; and because as the Sun recedes from us in Autumn, the Cold increasing, the Vapours that had lingered above, during the Summer Heats, are now dispatch'd down.

Why a settled, thick, close Sky seldom ever Rains, till it has been first clear'd; because the equally confus'd Vapours must first be condensed and congregated into separate Clouds, to lay the Foundation of Rain; by which Means the rest of the Face of the Heaven is left open, and pervious to the Rays of the Sun, &c.

Mons. *Le Clerc* observes, That all Winds do not produce Rains; but only such as collect a great Quantity of Vapours. Thus in Holland, West Winds are rainy, because they come from the Ocean, and blow up the Vapours; East Winds blow clear, because they come over vast Tracts of Land; North Winds are rainy, because they come from the North Sea; but not so rainy as the West; because the cold North does not yield such a Quantity of Vapours, as the kinder Climate of the Britannick Ocean: South Winds bring Rain too; for that they consisting of Vapours raised by the Heat of the Sun, in a hot Quarter, and so being elevated above others in the Air, seem to lie upon our Clouds, and press them down towards the Earth.

But notwithstanding, there are many Exceptions in those Cases, according to the Variety of Causes conspiring to the same Effect, many of which we know nothing of.

Again, Rain may be produced after this Manner; If the Vapours rise in so great abundance, as to reach and mingle with the Clouds above them, then they cause Rain in very large Drops, and this may happen in still, sultry Weather, for then the Clouds which are over our Heads have no sensible Motion, and in the mean time the Heat fills the Air with Vapours, which joining with the Clouds, and so being stopped in their Progress, open a Passage for the Stores in the Clouds to descend upon the Earth.

Sometimes also, the warm Wind thaws the Clouds into Drops, as we see Snow dissolved by Heat: Now, by how much the thicker and sooner any such Cloud was gathered, the larger are the Drops that come from it, because a greater Store of Vapours was condensed there. From thence it is, that in Summer time, we have sudden Showers of Rain in very large Drops.

It ought also to be remembered, that in those Countries which lie between the Tropicks, where they have the Sun Vertical, the Rain pour-

pours down for several Weeks together, more like Pails-full than Drops. And it is very probable that this is the Cause, viz. Because at that Time the Sun draws up abundance of Vapours, and rarefies them extremely, so that they are elevated as high as possible, and then are precipitated at once, being too copious and heavy to hang any longer in the Air; and besides, there may sometimes be a Concurrence of neighbouring Vapours, which will be ready to crowd into that Part in the Air, which is most rarefied by the Heat of the Sun meeting with the Vapours, which are raised in that Place, and produce very great Clouds and Rain.

If any ask how the Drops of falling Water come to be round, as in Rain? It is answered, That this does not happen by any Disposition peculiar to the Water; but because the Drops are equally pressed by the Air on every Side, and thereby forced into a round Figure: the Resistance of the Particles, as well as the Pressure of the Air, being equal every Way; but others give other Reasons for it.

In Rain, there are two distinct Properties or Species; the one which serves for the Dissolution of the Salts of the Earth, and the other is a Terrestrial Matter, which it meets with in

its Sublimation, which may with some Propriety, be call'd either Salt or Nitre, and both these are useful in the Business of Vegetation.

Rain is operative in dissolving the Salts that are in the Earth, and also cools and bathes the Cortex or Skin of all Vegetables, and by a sort of Relaxation, causes the Sap to pass up more freely, and by that Means the Tree to grow and shoot the better.

These foggy, humid Vapours arising out of the Ground, &c. of which Rain is formed, would inevitably stagnate and poison the whole Face of the Earth, were they not sublimated by the Air, and drawn up by the Assistance of the Sun into the upper Regions; but being there rarefied, they are made of second Use in Vegetation.

As to the Quantity of Rain that falls, its Proportion in several Places at the same Time, and in the same Place at several Times, we have Store of Observations, Journals, &c. in the Memoirs of the French Academy, the Philosophical Transactions, &c. an Idea of which take as follows:

Upon measuring, then, the Rain falling yearly, its Depth, at a Medium, is found as in the following Table;

Depth of RAIN falling Yearly, and its Proportion in several Places.							
At Townley in Lancashire, observed by Mr. Townley				-	-	-	42 $\frac{1}{2}$ Inches
Upminster in Essex, by Mr. Derham				-	-	-	19 $\frac{1}{4}$
Zurich in Switzerland, by Dr. Scutcher				-	-	-	32 $\frac{1}{4}$
Pisa in Italy, by Dr. Mich. Ang. Tilli				-	-	-	43 $\frac{1}{4}$
Paris in France, by M. de la Hire				-	-	-	19
Lisle in Flanders, by M. de Vauban				-	-	-	24
Proportions of the RAIN of several Years to one another.							
At UPMINSTER.				At PARIS.			
1700	19	Inches	03 Cent.	21	Inches	38	Cent.
1701	18		69	27		78	
1702	20		38	17		42	
1703	23		99	18		51	
1704	15		81	21		20	
1705	16		93	14		82	
Proportion of the RAIN of the several Seasons to one another.							
1708	Depth at Pisa	Depth at Upminster	Depth at Zurich	1708	Depth at Pisa	Depth at Upminster	Depth at Zurich
	Inch.	Inch.	Inch.		Inch.	Inch.	Inch.
January	6 41	2 88	1 64	July	0 00	1 11	3 50
February	3 28	0 46	1 65	August	2 27	2 94	3 15
March	2 65	2 03	1 51	September	7 21	1 46	3 02
April	1 25	0 96	4 69	October	5 33	0 23	2 24
May	3 33	2 02	1 91	November	0 13	0 86	0 62
June	4 90	2 32	5 91	December	0 00	11 97	2 62
Half Year	28 82	16 67	17 31	Half Year	14 94	8 57	15 35

The

The Reverend Mr. Hales, in his excellent Treatise of *Vegetable Statics*, tells us, that the Quantity of Rain and Dew that falls in a Year, is at a Medium 22 Inches, and that the Quantity of the Earth's Evaporation in a Year, is at least $9\frac{1}{2}$ Inches, since that is the Rate, at which it evaporates in a Summer's Day, from which $9\frac{1}{2}$ Inches is to be deducted 3.39 Inches, for circulating daily Dew; there remains 6.2 Inches, which 6.2 Inches deducted from the Quantity of Rain which falls in a Year, there remains at least 16 Inches Depth to replenish the Earth with Moisture for Vegetation, and to supply Springs and Rivers.

Hence we find, that 22 Inches Depth of Rain in a Year, is sufficient for all the Purposes of Nature in such flat Countries as is that about *Teddington* near *Hampton-Court*: But in the Hill Countries, as in *Lancashire*, there falls 42 Inches Depth of Rain-water; from which deducting 7 Inches for Evaporation, there remains 35 Inches Depth of Water, besides great Supplies from much more plentiful Dews than fall in plain Countries.

Which vast Stores seem so abundantly sufficient to answer the great Quantity of Water, which is conveyed away by Springs and Rivers from those Hills, that we need not have recourse for Supplies to the great Abyss, whose Surface at High Water, is surmounted some hundreds of Feet by ordinary Hills, and some thousands of Feet by those vast Hills, from whence the longest and greatest Rivers take their Rise.

RAINBOW, a Meteor in Form of a party-coloured Arch or Semi-circle, exhibited in a rainy Sky opposite to the Sun, by the Refraction of his Rays in the Drops of falling Rain.

The *Rainbow*, Sir *Isaac Newton* observes, never appears but where it rains in the Sunshine, and may be represented artificially, by contriving Water to fall in little Drops like Rain, through which the Sun shining, exhibits a Bow to the Spectator's Eye, placed between the Sun and the Drops; especially if a dark Body, *e. g.* a Black Cloth be disposed beyond the Drops.

Anton de Denicinis first accounted for the *Rainbow* in 1611: He explain'd at large how it was form'd by Refraction and Reflexion of the Sun-beams in spherical Drops of Water, and confirm'd his Explication by Experiments made with Glass Globes, &c. full of Water; wherein he was follow'd by *Des Cartes*, who mended and improv'd upon his Account.

But as they were both in the Dark, as to the true Origin of Colours, their Explications are defective, and in some Things erroneous, which it is one of the Glories of the *Newtonian* Doctrine of Colours to supply and correct.

The following Properties are ascribed to the *Rainbow*;

1. That it never appears but in a Place opposite to the Sun, so that when we look directly at it, the Sun is always behind us.

2. That when the *Rainbow* appears, it always rains some-where.

3. That the constant Order of the Colours is, that the outmost is *Red* or *Saffron-colour*, the next is *Yellow*, the third is *Green*, the fourth and inmost is *Violet* or *Blue*; but these Colours are not always equally bright.

4. Two *Rainbows* appear together, one of which is higher and larger than the other, and shews the aforesaid Colours, but in an inverted Order.

5. The *Rainbow* is always exactly round, but does not always appear equally intire, the upper or lower Parts being very often wanting.

6. Its apparent Breadth is always the same.

7. That those who stand upon plain low Ground, never see above half its Circle, and oftentimes not so much.

8. The higher the Sun is above the Horizon, the less of the Circle is seen, and if there be no Cloud to hinder, the lower the more of it.

9. That never any *Rainbow* appears, when the Sun is above 41 Degrees 46 Minutes high.

Lunar RAINBOW: The Moon also sometimes exhibits the Phænomena of an *Iris* or *Bow*; by the Refraction of her Rays in the Drops of Rain in the Night-time.

Aristotle says, he was the first that ever observ'd it; and adds, that it never happens, *i. e.* is visible, but at the Time of the Full Moon, her Light at other times being too faint to affect the Sight. After two Refractions and one Reflection, the *Lunar Iris* has all the Colours of the *Solar* very distinct and pleasant, only faint in Comparison of the other, both from the different Intensity of the Rays, and the different Disposition of the Medium.

Marine RAINBOW, is a Phænomenon sometimes observed in a much agitated Sea, when the Wind sweeping part of the Tops of the Waves, carries them aloft; so that the Sun's Rays falling upon them, are refracted, &c. as in a common Shower, and paint the Colours of the Bow.

F. Bourzes, in the *Philosophical Transactions*, observes, that the Colours of the *Marine Rainbow* are less lively, distinct and of less Duration than those of the common *Bow*, that there are scarce above two Colours distinguishable, a dark Yellow on the Side next the Sun, and a pale Green on the opposite Side.

But these Bows exceed as to Number, there being sometimes 20 or 30 seen together; they appear at Noon-Day, and in a Position opposite to that of the common *Bow*, *i. e.* the Concave Side is turned upwards, as indeed it is necessary it should be, from what may be said in accounting for the Appearance of the *Solar Bow*.

RAMPIONS; *vide* *Campanula radice, esculente*.

RAMUS, a Branch, is the Division of a Stalk; in Trees it is often called a *Bough*.

RANUN.

RANUNCULUS, [so call'd, as some say, from *Rana*, Lat. a Frog, on account of its delighting to grow in moist Places, which Frogs frequent.] Crowfoot.

The Characters are;

The Flower consists of several Leaves, which are placed in a circular Order, and expand in Form of a Rose; having, for the most part, a many-leaf'd Empalement or Flower-cup; out of the Middle of the Flower rises the Pointal, which afterwards becomes a Fruit, either round, cylindrical, or spiked; to the Axis of which, as a Placenta, adhere many Seeds, for the most part naked.

The Species are;

1. **RANUNCULUS**; *hortensis, erectus, flore pleno*. C. B. P. Common yellow Crowfoot with a double Flower.
2. **RANUNCULUS**; *repens, flore pleno*. J. B. Common creeping Crowfoot with a double Flower.
3. **RANUNCULUS**; *Montanus, aconiti folio, albus, flore minore*. C. B. P. Mountain Crowfoot with a white Flower.
4. **RANUNCULUS**; *folio aconiti, flore albo, multiplici*. C. B. P. Crowfoot with a Monk's-hood Leaf and a double white Flower, commonly called The Fair Maid of France.
5. **RANUNCULUS**; *bulbosus, flore pleno*. C. B. P. Common bulbous-rooted Crowfoot with a double Flower.
6. **RANUNCULUS**; *Constantinopolitanus, flore sanguineo, pleno*. J. B. Common Ranunculus with a double bloody Flower.
7. **RANUNCULUS**; *asphodeli radice, prolifer, miniatus*. C. B. P. Ranunculus with an Asphodel Root and Childing Carmine Flowers, commonly called Turks Turban.
8. **RANUNCULUS**; *Asiaticus polycelonus, five grumosa radice secundus*. J. B. Asiatick Ranunculus with many Heads and a grumose Root, commonly called Sphericus.
9. **RANUNCULUS**; *Asphodeli radice, flore sanguineo maximo*. H. R. Par. Asphodel-rooted Ranunculus with a very large red Flower, commonly called The Monster.
10. **RANUNCULUS**; *Asphodeli radice, flore subphœnicio rubente*. C. B. P. Asphodel-rooted Ranunculus with purplish-red Flowers commonly called Marvelia.
11. **RANUNCULUS**; *Asphodeli radice, flore luteo variegato*. H. R. Par. Asphodel-rooted Ranunculus with a yellow variegated Flower.
12. **RANUNCULUS**; *Alepus, grumosa radice, flore lineis rubris & luteis striato*. H. R. Par. Grumose-rooted Crowfoot with a Flower strip'd with red and yellow Lines, commonly called Ranunculus of Aleppo.
13. **RANUNCULUS**; *Asphodeli radice, flore flavo, venis rubris distincto; Boswell dictus*. H. R. Par. Crowfoot with an Asphodel Root and yellow Flower with red Veins, commonly called Bosvel.
14. **RANUNCULUS**; *Alepus, grumosa radice, flore miniato, per oras luteo*. H. R. Par. Aleppo Crowfoot with a grumose Root and a Carmine Flower bordered with yellow.
15. **RANUNCULUS**; *flore pleno, flavescente, & rubris lineis elegantissimè variegato*. H. R. Par.

Crowfoot with a double yellow Flower curiously strip'd with red Lines, commonly called Aurora.

16. **RANUNCULUS**; *Asphodeli radice, flore pleno, albo, parvo, rubris striis distincto*. H. R. Monsp. Crowfoot with an Asphodel Root, and a small double white Flower strip'd with red.

17. **RANUNCULUS**; *Asphodeli radice, flore pleno, magno, lacteo, superius lituris rubris eleganter picto*. Boerb. Ind. Crowfoot with an Asphodel Root and a large double white Flower, mark'd above with red Spots, commonly called The Seraphick.

These are most of them old Flowers, which have been long cultivated in the English Gardens: The five first-mention'd Sorts are very hardy Plants, and will thrive extremely well in shady Borders; these require no other Culture, but to take up their Roots every other Year, when their Leaves decay, and part 'em, planting out the Off-sets in other Borders, lest by permitting them to grow too large, they rot each other. The creeping Sort will require to be oftner transplanted, otherwise it will spread over every thing that grows near it. These do all produce handsome double Flowers, which continue long in Beauty, and afford an agreeable Variety, and being hardy, are worthy of a Place in every good Garden.

The other Sorts were originally brought from Turkey, and were formerly in great Esteem in England, but of late Years there have been introduced many other Sorts of a differing Kind, from Persia, amongst which are many with semi-double Flowers, which produce Seeds, from which there are such prodigious Varieties of new Flowers annually obtain'd, which are so large, and of such Variety of beautiful Colours, as to exceed all other Flowers of that Season, and even vie with the most beautiful Carnations: These are, many of them, finely scented, and the Roots, when strong, do generally produce eight, ten, or twelve Flowers upon each, which succeeding each other, do continue in Beauty a full Month, or longer, according to the Heat of the Season, or the Care taken to defend them from the Injuries of the Weather; all which excellent Qualities have render'd them so valuable, that the old Sorts here-named are almost disregarded, except in some old Gardens; but however, as they are still preserved by some Persons, so I shall briefly set down their Management, before I proceed to that of the new Kinds, which must be treated in a different manner from these.

All these very double Flowers do never produce Seeds, so that they are only multiplied by Off-sets from their Roots, which they generally produce in good Plenty, if planted in a good Soil, and duly attended in Winter. The Season for Planting their Roots is any time in October, for if they are planted sooner, they are apt to come up in a short Time, and grow pretty rank before Winter, whereby they will be in greater Danger of suffering by Frost; and if they are planted much later, they will be

in Danger of perishing under-ground; so that if you keep them out of the Ground any longer than the Beginning of *November*, it will be the better Way to defer the Planting of them 'till the latter End of *January* or the Beginning of *February*, after the great Frosts are past.

The Beds in which these Roots are planted, should be made with fresh, light, sandy Earth, at least a Foot deep: The best Soil for these Roots may be compos'd in the following Manner, viz. Take a Quantity of fresh Earth from a rich up-land Pasture, about six Inches deep, together with the Green-sward; this should be laid in a Heap to rot for twelve Months before it is used, observing to turn it over very often, to sweeten it, and break the Clods; to this you should add a proportionable Quantity of Sea or Drift Sand, according as the Earth is lighter or stiffer; if it be light and inclining to a Sand, one load of Sand will be sufficient for four Loads of Earth; but if the Earth is strong and heavy, the Sand should be mix'd in equal Quantity therewith; but you should often turn it over, in order to unite their Parts well together, before it is put into the Beds.

The Depth which this should be laid in the Beds (as was before said) must be about a Foot, this should be below the Surface, in Proportion to the Dryness or Moisture of the Place where they are situated; which in dry Ground should be eight Inches below the Surface, and the Beds rais'd four Inches above; but in a moist Place, they should be six Inches below, and six above the Ground; and in this Case it will be very proper to lay some Rubbish and Stones in the Bottom of each Bed, to drain off the Moisture. This Earth I would by no means have screened very fine, but only in turning it over each Time, you should be careful to break the Clods, and throw out all large Stones, which will be sufficient, for if it is made very fine, when the great Rains in *Winter* come on, it will cause the Earth to bind into one solid Lump, whereby the Moisture will be detain'd, and the Roots not being able to extend their tender Fibres, will rot: Of this I have seen many Examples, but one particularly to my Cost; when I had procured a fine Parcel of these Roots from abroad, and being desirous of having them thrive very well, I took great Pains to screen the Earth of my Beds very fine, which I laid near two Feet deep, and planted a good Part of my Roots therein; but the Season advancing, and having a great deal of other Business upon my Hands, I did not screen the Earth of all my Beds, but planted some of them without doing any thing more than raking them; and the Success was, that the Roots in those Beds which were screened, did, great Part of them, entirely rot, and the remaining Part were so weak, as not to produce any good Flowers; whereas those which were planted in the Beds which were not screened, did thrive and flower very well, and scarce any of the Roots fail'd, tho'

the Earth of all the Beds was the same, and were in the same Situation, both with regard to Wind and Sun, so that the Damage which those Roots sustain'd was owing entirely to the Fineness of the Earth; and this I have several Times since observed in other Gardens.

The Beds being thus prepared, should lie a Fortnight to settle, before the Roots are planted, that there may be no Danger of the Earth settling unequally after they are planted, which would prejudice the Roots, by having hollow Places in some Parts of the Bed, to which the Water would run and lodge, and so rot the Roots in such Places. Then having levelled the Earth, laying the Surface a little rounding, you should mark out the Rows by a Line, at about four Inches Distance each Way, so that the Roots may be planted every Way in strait Lines; then you should open the Earth with your Fingers, at each Cross, where the Roots are to be planted, about two Inches deep, placing the Roots exactly in the Middle, with their Crowns upright, then with the Head of a Rake you should draw the Earth upon the Surface of the Bed level, whereby the Top of the Roots will be about an Inch covered with Earth, which will be sufficient at first: This Work should be done in dry Weather, because the Earth will then work better than if it were wet; but the sooner after Planting there happens to be Rain, the better it will be for the Roots; for if it should prove dry Weather long after, and the Earth of the Beds be very dry, the Roots will be subject to mould and decay; therefore in such a Case it will be proper to give a little Water to the Beds, if there should no Rain happen in a Fortnight's Time, which is very rare at that Season of the Year, so that they will seldom be in Danger of suffering that Way.

When the Roots are thus planted, there will no more be required until toward the Middle of *November*, by which Time they will begin to heave the Ground, and their Buds appear, when you should lay a little of the same fresh Earth, of which the Beds were compos'd, about an Inch thick all over the Beds, which will greatly defend the Crown of the Root from Frost: And when you perceive the Buds to break through this second Covering, if it should prove a very hard Frost, it will be very proper to arch the Beds over with Hoops, and cover them with Mats, especially in the *Spring*, when the Flower-buds will begin to appear, for if they are exposed to too much Frost or blighting Winds at that Season, their Flowers do seldom open fairly, and many times the Roots are destroyed: But this happens more frequently to the *Persian* Kinds, which are tenderer, than to these Sorts, which are pretty hardy; for which Reason these are often planted in open Borders, intermix'd with other Flowers, though in very hard *Winters* these are apt to suffer, where there is not Care taken to guard off the Frost.

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In the Beginning of *March* the Flower-stems will begin to rise, at which Time you should carefully clear the Beds from Weeds, and stir the Earth with your Fingers between the Roots, being very careful not to injure them; this will not only make the Beds appear handsome, but also greatly strengthen their Flowers. When the Flowers are past, and the Leaves are withered, you should take up the Roots, and carefully clear 'em from the Earth, then spread them upon a Mat to dry, in a shady Place, after which they may be put up in Bags or Boxes in a dry Room, until the *October* following, which is the Season for Planting them again.

Thus having directed how these Sorts are to be cultivated, I shall proceed to treat of the *Persian* Kinds, in which I shall only mention in what Particulars these are to be treated different from those already mentioned.

These Flowers are not only propagated by Off-sets from the old Roots, as the former, but are also multiplied by Seeds, which the semi-double Kinds do produce in Plenty. Therefore whoever is desirous to have these in Perfection, should annually sow their Seeds, from which new Varieties will be every Year produced; but in order hereto, you should be careful in saving the Seed, or in procuring it from such Persons as understand how to save it; that is, who will be careful not to leave any Flowers for Seeds, but such as have three or four Rows of Petals at least, and are well coloured; for since these Flowers do increase so plentifully, it is not worth the Trouble to sow any indifferent Seeds, because there can be but little Hopes of obtaining any good Flowers from such Seeds.

Being prepared with Seeds, about the Middle of *August*, which is the proper Season for sowing of them, you should get some large Pots, flat Seed-pans or Boxes, (of either as many as you have Seeds to sow) these should be filled with light, sandy, rich Earth, levelling the Surface very even, then sow the Seeds thereon pretty thick, and cover it about a Quarter of an Inch thick with the same light Earth; after which you should remove these Pots into a shady Situation, where they may have the Morning Sun until ten of the Clock; and if the Season should prove dry, you must often refresh 'em with Water, being very careful in doing of this, so as not to wash the Seeds out of the Ground. In this Situation the Pots should remain until the Beginning of *October*, by which Time the Plants will begin to come up, (though sometimes the Seeds will remain in the Earth until *November*, before the Plants appear) when you should remove the Pots into a more open Exposure, where they may have full Sun, which at that Time is necessary to exhale the Moisture of the Earth; but toward the Middle of *November*, when you are apprehensive of Frost, the Pots should be removed under a common Hot-bed Frame, where they may be covered with the Glasses in the Night-time and in bad Weather, but in the Day, when the Weather is mild, they should be entirely opened, other-

wise the Plants will draw up too weak: the only Danger they are in, is from violent Rains and Frosts, the first often rotting the tender Plants, and the Frost will often turn them out of the Ground, therefore they should be carefully guarded against both of these.

In the *Spring*, as the Season grows warm, so these Pots should be expos'd to the open Air, placing them at first near the Shelter of a Hedge, to protect them from the cold Winds; but towards the latter End of *March*, or the Beginning of *April*, they should be remov'd again into a more shady Situation, according to the Warmth of the Season; and if it should prove dry, they must be sometimes refresh'd with Water; but you should be careful not to give it to 'em in great Quantities, which is very apt to rot these tender Roots: and in the Middle or latter End of *April*, they should be plac'd where they may have only the Morning Sun: in which Place they may remain till their Leaves decay: when they may be taken out of the Earth, and the Roots dry'd in a shady Place; after which they may be put up in Bags, and preserv'd in a dry Place until the *October* following; when they must be planted in the Manner before directed for the old Roots.

The *Spring* following, these Roots will flower; at which time you should carefully mark such of them as are worthy to be preserv'd: and the single or bad-colour'd Flowers may be pull'd up and thrown away, which is the surest Method of removing them from the good Sorts; for if they are permitted to remain together until their Leaves decay, there may be some Off-sets of the bad Sorts mix'd with the good Flowers. You should not suffer those Flowers which you intend to blow fine the succeeding Year, to bear Seeds, but cut off the Flowers when they begin to decay; for those Roots which have produc'd Seeds, do seldom flower well afterwards, nor will the principal old Root, which has flower'd strong, ever blow so fair as will the Off-sets, which is what should be principally observ'd, when a Person purchases any of these Roots; and a great Part of the Complaints made by those who have bought these Roots at a dear Rate, is principally owing to this; for the Persons who sold them being appriz'd of this Matter, have parted with their old Roots to their Purchasers, and reserv'd the Off-sets for their own Use; which old Roots have often so much degenerated from what they were the preceding Year, as to cause a Suspicion, whether the Persons they were purchas'd from had not chang'd the Roots; and this Degeneracy always attends these Flowers, after having flower'd extremely large and fair, or that they have been permitted to seed: So that it is absolutely necessary to sow Seeds every Year, in order to preserve a Succession of good Flowers.

The Soil which these delight most in, is a rich, light, sandy Earth; but whatever Dung is added to the Earth, should be very rotten, and ought to be mix'd with the Earth at least six Months before it be us'd: During which Time

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it should be often turn'd over to mix the Parts well together; and the lighter this Earth is, the better will the Flowers thrive: But, as I before said, it is by no means advisable to sift or screen it too fine, for the Reasons already given. Some there are who mix rotten Tan, or Saw-dust with their Earth, to render it light; but this is also bad for these Flowers, as I have several times experienc'd, especially if either of these be not so rotten as to have quite lost its Appearance, and reduc'd to Earth: for tho' the Roots will often come up very strong, and flourish very vigorously till the Beginning of February; yet at that Season it is very common to have them die off in large Patches: Which, when I have observ'd, I have search'd to the Bottom of the Roots, and found some Part of the Tan or Saw-dust lying near them, which has detain'd the Moisture, and thereby rotted the Roots.

The Manner of preparing the Beds, and the Distance and Method of planting the Roots, being exactly the same as hath been already directed for the old Sorts, I shall not repeat it here, but will only observe, that these Flowers being more tender than the others, must be protected from hard Frosts and cutting sharp Winds, especially after Christmas, when their Flower-buds are forming; for if they are neglected at that Season, their Flowers will rarely prove fair; nor should you suffer them to receive too much Wet in Winter or Spring, which is equally as injurious to them as Frost. In planting of these Roots you should observe to place the semi-double Kinds, from which you intend to save Seeds, in separate Beds by themselves, and not intermix them with the double Flowers, because they will require to be treated in a different manner; for when the Flowers of the semi-double Kinds begin to fade, you should carefully guard them from Wet; for if they are permitted to receive hard Rains, or are water'd at that Season, the Seeds do rarely come to Maturity, or are so weak, that scarce one in fifty of them will grow.

When the Seed begins to ripen, (which may be easily known by separating from the Axis, and falling) you should look it over every Day, gathering it as it ripens, for there will be a considerable Distance in the Seeds of the same Bed coming to Maturity, at least a Fortnight, and sometimes three Weeks or a Month. When you gather the Seed, it should not be expos'd to the Sun, but spread to dry in a shady Place; after which, you must put it up where the Vermin can't come to it, until the Time of sowing it.

By this Method of sowing Seeds every Year, you will not only increase your Stock of Roots, but also raise new Varieties, which may be greatly mended by changing the Seeds into fresh Ground; for if a Person continually sows his Seed in the same Garden, many Years, they will not produce near so fine Flowers, as if he procured his Seeds at some Distance; which is also the Case with most other Plants.

It will also be necessary to take away all the

Earth out of the Beds in which the Roots were blown the precedent Year, and put in new, if you intend to plant *Ranunculus*'s there again; otherwise they will not thrive near so well, notwithstanding you may add some new Compost to the Beds: And this is what all the curious Florists do continually observe.

RAPA; Turnip.

The Characters are;

The Flower consists of four Leaves, which are plac'd in Form of a Cross; out of the Flower-cup rises the Pointal, which afterwards turns to a Pod, divided into two Cells by an intermediate Partition, to which the Valves adhere on both Sides, and are full of roundish Seeds: To these Marks must be added, A carneous and tuberosc Root.

The Species are;

1. RAPA; *fativa, rotunda, radice candida*. C. B. P. Round Garden Turnip, with a white Root.

2. RAPA; *fativa, rotunda, radice supra terram viridi*. Boerb. Ind. Round Garden Turnip, whose Root is green above Ground.

3. RAPA; *fativa, rotunda, radice punicea*. C. B. P. Round Garden Turnip, with a purple Root.

4. RAPA; *fativa, rotunda, radice obsolete nigricante*. C. B. P. Round Garden Turnip, with a rusty black Root.

5. RAPA; *fativa, rotunda, radice foris & intus flavescente*. C. B. P. Round Garden Turnip, with a yellow Root both within and without.

6. RAPA; *radice oblonga, seu femina*. C. B. P. Oblong or Female Turnip.

There are some other Varieties of this Plant, which differ in the Shape or Colour of their Roots; but as they are only seminal Variations, so it would be needless to enumerate them in this Place, since it is the first and third Sort here mention'd, which are chiefly cultivated for the Table in England. The yellow Sort, and that with long Roots, were formerly more cultivated than at present; for it is now very rare to see either of these brought to the Markets, though, some Years since, they were sold in as great Plenty as the common round Sort.

Turnips delight in a light, sandy Soil, which must not be rich, for in a rich Soil they grow rank and are sticky; but if it be moist they will thrive the better, especially in a fresh Land, where they are always sweeter than upon an old worn-out Soil.

The common Season for sowing of Turnips is any time from the Beginning of July to the Middle of August, or a little later; tho' it is not advisable to sow them much after, because if the Autumn should not prove very mild, they will not have time to Apple before Winter. But notwithstanding this is the general Season in which the greatest Part of Turnips are sown in the Country, yet about London they are sown successively from March to August, by those who propagate them to supply the Markets with their Roots; but there is a great Hazard of losing those which are sown early in the Year, if the Season should prove

prove dry, by the Fly, which will devour whole Fields of this Plant while young; so that where a small Quantity for the Supply of a Family is wanted, it will be absolutely necessary to water them in very dry Weather: And where a Person sows of those Seeds in *April*, *May* and *June*, it should always be upon a moist Soil, otherwise they seldom come to good, the Heat of the Weather at that Season being too great for them upon a dry Soil: But those which are sown towards the Middle or latter End of *July*, do commonly receive some refreshing Showers to bring them forward; without which, it is very common to have 'em all destroy'd.

These Seeds should always be sown upon an open Spot of Ground; for if they are near Hedges, Walls, Buildings, or Trees, they will draw up and be very long topp'd, but their Roots will not grow to any Size.

They are sown in great Plenty in the Fields near *London*, not only for the Use of the Kitchen, but for Food for Cattel in *Winter* when other Food fails; and this Way is become a great Improvement to barren, sandy Lands, particularly in *Norfolk*, where, by the Culture of *Turnips*, many Persons have doubled the yearly Value of their Ground.

The Land upon which this Seed is sown should be ploughed in *May*, and twy-fallow'd in *June*, and made very fine; then the Seed should be sown pretty thin, (for it being small, a little will sow a large Piece of Ground, two Pounds of this Seed is sufficient for an Acre of Land): The Seed must be harrow'd in, and the Ground rolled with a wooden Roll, to break the Clods and make the Surface even: In ten Days or a Fortnight after sowing, the Plants will come up; at which time, if the Season should prove dry, they will be in great Danger of being destroy'd by the Fly: But if it so happen, the Ground must be sow'd again, for the Seed being cheap, the chief Expence is the Labour.

When the Plants have got four or five Leaves, they should be hoed to destroy the Weeds, and to cut up the Plants where they are too thick, leaving the remaining ones about six or eight Inches asunder each Way, which will be Room enough for the Plants to stand for the first Hoeing: But in the second Hoeing, which must be perform'd about three Weeks or a Month after the first, they should be cut up, so as that the remaining Plants may stand fourteen or sixteen Inches Distance or more, especially if they are design'd for feeding of Cattel; for where the Plants are allow'd a good Distance, the Roots will be proportionably large, so that what is lost in the Number, will be over-gain'd by their Bulk; which is what I have often observ'd: But in such Places where they are sown for the Use of the Kitchen, they need not be left at a greater Distance than ten Inches or a Foot, because large Roots are not so generally esteem'd for the Table.

In order to save good *Turnip-Seeds*, you should transplant some of the fairest Roots in *February*, placing them at least two Feet asun-

der each Way, observing to keep the Ground clear from Weeds, until the *Turnips* have spread so as to cover the Ground, when they will prevent the Weeds from growing; and when the Pods are form'd, you should carefully guard them against the Birds, otherwise they will devour it, especially when it is near ripe; at which time, you should either shoot the Birds as they alight upon the Seed, or lay some birdlim'd Twigs upon it, whereby some of them will be caught, and if they are permitted to remain some time, and afterwards turn'd loose, they will prevent the Birds from coming there again for some time, as I have experimented. When the Seed is ripe, it should be cut up, and spread to dry in the Sun; after which it may be thrashed out, and preserved for Use.

RAPHANUS; [of *ῥαδις*, *easy*; and *φαίνω*, to appear, *q. d.* a Plant easily appearing; for this Plant being sown, quickly puts forth out of the Ground.] Radish.

The Characters are;

The Flower consists of four Leaves, which are plac'd in Form of a Cross; out of the Flower-cup rises the Pointal, which afterwards turns to a Pod in Form of a Horn, that is thick, spongy, and furnish'd with a double Row of roundish Seeds, which are separated by a thin Membrane.

The Species are;

1. **RAPHANUS**; *minor, oblongus. C. B. P.* Small oblong or common Radish.

2. **RAPHANUS**; *niger, major, rotundus. Mor. Hist.* Great round black Radish, commonly call'd The Spanish Radish.

3. **RAPHANUS**; *major, orbicularis, floribus candidis. C. B. P.* Great Round-rooted Radish, with white Flowers.

4. **RAPHANUS**; *minus, oblongus, pyriformis, vulgō Ramurazza. Hort. Cath.* The lesser Radish, with an oblong Pear-shap'd Root.

5. **RAPHANUS**; *major, orbicularis, vel rotundus. C. B. P.* Greater Radish, with a round Root.

The first Sort here mention'd, is that which is commonly cultivated in Kitchen-Gardens for its Root; of which there are several Varieties, as the Small-topp'd, the Drop-red, and the Long-topp'd striped Radish; all which are Varieties arising from Culture: The Small-topp'd Sort is most commonly prefer'd by the Gardeners near *London*, because they require much less Room than those with large Tops, and may be left much closer together: And as the forward Radishes are what produce the greatest Profit to the Gardener, so these being commonly sown upon Borders near Hedges, Walls, or Pales, if they are of the large-topp'd Sort, they will be apt to grow mostly to Top, and not swell so much in the Root as the other, especially if they are left pretty close.

The Seasons for sowing this Seed are various, according to the Time when they are desir'd for Use: But the earliest Season is commonly toward the latter End of *October*, that the Gardeners near *London* sow them to supply the Market; and these, if they do not miscarry, will be fit for

Use in *March* following, which is full as soon as most People care to eat them. These (as I said before) are commonly sown on warm Borders, near Walls, Pales, or Hedges, where they may be defended from the cold Winds.

The second Sowing is commonly about *Christmas*, provided the Season be mild, and the Ground in a fit Condition to work: These, are also sow'd near Shelter, but not so near Pales or Hedges, as the first Sowing: These if they are not destroy'd by Frost, will be fit for Use the Beginning of *April*: But in Order to have a Succession of these Roots for the Table through the Season, you should repeat sowing of their Seeds once a Fortnight, from the Middle of *January* till the Beginning of *April*, always observing to sow the latter Crops upon a moist Soil, and an open Situation, otherwise they will run up, and grow sticky before they are fit for Use.

Many of the Gardeners near *London* sow *Carrot-Seed* with their early *Radishes*; so that many times when their *Radishes* are kill'd, the *Carrots* will remain; for the Seeds of *Carrots* commonly lie in the Ground five or six Weeks before they come up; and the *Radishes* seldom lie above a Fortnight under Ground; so that these are often up, and kill'd, when the *Carrot-Seed* remains safe in the Ground: But when both Crops succeed, the *Radishes* must be drawn off very young, otherwise the *Carrots* will be drawn up so weak as not to be able to support themselves when the *Radishes* are gone.

It is also a constant Practice with these Gardeners, to mix *Spinach-Seed* with their latter Crop of *Radishes*; so that when the *Radishes* are drawn off, and the Ground clean'd between the *Spinach*, it will grow prodigiously, and in a Fortnight's-time will as completely cover the Ground as tho' there had been no other Crop: And this *Spinach*, if it be of the broad-leav'd Kind, will be larger and fairer than it commonly is when sown by itself; because where People have no other Crop mix'd with it, they commonly sow it too thick, whereby it is drawn up weak: But here the Roots stand pretty far apart, so that after the *Radishes* are gone, they have full Room to spread, and if the Soil be good, it is a prodigious Size this *Spinach* will grow to before it runs up for Seed: But this Husbandry is chiefly practis'd by the Gardeners who pay very dear for their Land, and are oblig'd to have as many Crops in a Year as possible, otherwise they could not afford to pay such large Rents.

When the *Radishes* are come up, and have got five or six Leaves, they must be pull'd up where they are too close, otherwise they will draw up to Top, but the Roots will not increase their Bulk: In doing of this, some only draw them out by Hand; but the best Method is to hoe them with a small Hoe, which will stir the Ground, and destroy the young Weeds, and also promote the Growth of the Plants. The Distance which these should be left, if for drawing up small, may be three Inches; but if they are to stand until they are pretty large, six Inches is full near enough; and a small Spot of Ground will afford as many *Radishes*

at each sowing, as can be spent in a Family while they are good.

If you intend to save Seeds of your *Radishes*, you should, about the Beginning of *May*, prepare a Spot of Ground in Proportion to the Quantity of Seeds intended, (but you should always make Allowance for bad Seasons, because it often happens, in a very dry Season, that there will not be a fourth Part of the Quantity of Seeds upon the same Proportion of Ground as there will be in a moist Season): This Ground should be well dug and levell'd; then you should draw up some of the straightest and best colour'd *Radishes*, (throwing away all such as are short, and that branch out in their Roots:) These should be planted in Rows three Feet distance, and two Feet asunder in the Rows, observing, if the Season be dry, to water them until they have taken Root; after which they will require no farther Care but only to hoe down the Weeds between them, until they are advanc'd so high, as to spread over the Ground, when they will prevent the Growth of Weeds.

When the Seed begins to ripen, you should carefully guard it against the Birds, who will otherwise destroy it: When it is ripe, (which you may know by the Pods changing brown) you should cut it, and spread it in the Sun to dry; after which you should thrash it out, and lay it up for Use, where the Mice cannot come to it, otherwise they will eat it up.

The small round-rooted *Radish* is not very common in *England*, but in many Parts of *Italy* it is the only Sort cultivated: The Roots of this Kind are many times as large as a small *Turnip*, and are very sweet. This may be propagated in the same manner as the common Sort, but only with this Difference, *viz.* That this must not be sown till the Beginning of *March*, and the Plants allow'd a greater Distance. The Seeds of this Kind are very subject to degenerate when sav'd in *England*, so that it is proper to have them from Abroad every Year.

The other round-rooted *Radishes* are rarely cultivated in *England*, but those who have a mind to have them, may sow them in the same manner as the last.

The *Black Spanish Radish* is only cultivated for Medicinal Use in *England*: The Seeds of this may be sown in *May*, and when the Plants come up, they should be hoed out, so as to leave the remaining ones ten Inches or a Foot asunder; after which they must be constantly cleared from Weeds in *Summer*, and in *Autumn* they will be fit for Use.

RAPUNTIIUM; Rampions, or Cardinal's Flower.

The Characters are;

The Flower consists of one Leaf, which is of an anomalous Figure, hollowed like a Pipe, and furrow'd or channell'd, divided as it were into many Parts, in the Shape of a Tongue, defended by a Vagina or Covering, which enfolds the Pointal: When the Flowers decay, the Flower-cup turns to a Fruit, divided into three Cells, full of small Seeds, which adhere to a Placentæ, which is divided into three Parts.

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The *Species* are ;

1. *RAPUNTUM* ; *maximum, coccineo, spicato flore. Col. in Rech.* Greater Rampions, with a Crimson-spiked Flower, commonly call'd The Scarlet Cardinal's Flower.

2. *RAPUNTUM* ; *Americanum, flore dilute caruleo. H. R. Par.* The Blue Cardinal's Flower.

3. *RAPUNTUM* ; *Americanum, virgæ aureæ foliis, parvo flore caruleo. Tourn.* Cardinal's Flower, with Golden Rod Leaves and a small Blue Flower.

There are several other Varieties of this Plant growing in divers Parts of *America* ; but those here mention'd are all which I have observ'd cultivated in *England*. The first Sort is greatly priz'd by the Curious for the Beauty of its rich Crimson Flowers, which exceed all the Flowers I have yet seen, in the Deepness of its Colour : And these commonly, when their Roots are strong, produce large Spikes of these Flowers, which continue a long time in Beauty, and make a most magnificent Shew amongst other Flowers. The Time of their Flowering is commonly in *July* and *August*, and if the *Autumn* proves very favourable, they will sometimes produce good Seeds in *England*. These Plants are Natives of *Virginia* and *Carolina*, where they grow by the Sides of Rivulets, and make a most beautiful Appearance ; from whence the Seeds are often sent into *England*. These Seeds do commonly arrive here in the *Spring* ; at which Time they should be sown in Pots fill'd with light Earth, and but just cover'd over, for if the Seeds are bury'd deep they will not grow : These Pots should be placed under a Frame to defend them from Cold until the Season is a little advanc'd, but they should not be plac'd on a Hot-bed, which will also destroy the Seeds.

When the Weather is warm, towards the Middle of *April*, these Pots should be plac'd in the open Air, in a Situation where they may have the Morning-Sun till twelve o'Clock, observing to water them constantly in dry Weather ; and when the Plants come up, they should be transplanted each into a small Pot fill'd with fresh light Earth, and plac'd in the same Situation, observing to water them in dry Weather ; and in *Winter* they should be plac'd under a Hot-bed Frame, where they may be shelter'd from severe Frosts ; but in mild Weather, they should be as much expos'd to the open Air as possible.

The *March* following, these Plants should be put into larger Pots fill'd with the same fresh Earth, and plac'd, as before, to the Morning-Sun, observing to water them in dry Weather, which will cause them to flower strong the *Autumn* following.

These Plants are also propagated by parting of their Roots : The best Season for which is, either soon after they are past Flower, or in *March*, observing to water and manage them, as hath been directed for the Seedling Plants, both in *Winter* and *Summer*.

The Blue Sort does constantly produce ripe Seeds in *England*, which should be sown soon after they are ripe ; in the *Spring* following

the Plants will come up, when they should be transplanted and managed as the other Sort, with which Culture this will also agree. This is preserv'd for Variety ; but the Flowers are not near so beautiful as those of the former Sorts.

The other Sort, with small Blue Flowers, is a biennial Plant, perishing as soon as the Seeds are ripe. This may be rais'd in the same Manner as the former, but is scarcely worthy of a Place in a Flower-garden.

RHABARBARUM MONACHORUM ; *vide* *Lapathum*.

RHAMNOIDES ; The Sea Buckthorn.

The Characters are ;

It hath the whole Appearance of the Buckthorn, but is Male and Female in different Trees : The Flowers of the Male have no Petals ; the Flower-cup consists of two Leaves, in the Center of which are several small Stamina : The Female Trees produce roundish Berries, each of which contains a single Seed.

The Species are ;

1. *RHAMNOIDES* ; *florifera, salicis foliis. T. Cor.* Male Willow-leav'd Sea Buckthorn.

2. *RHAMNOIDES* ; *frutifera, foliis salicis, baccis leviter flavescens. T. Cor.* Female Willow-leav'd Sea Buckthorn, with yellow Berries.

These Plants do grow in great Plenty upon the Sea-coasts of *Lincolnshire*, and at *Sandwich, Deal* and *Folkston* in *Kent*, as also in divers Parts of *Scotland*.

They are preserv'd in several Gardens near *London* for Variety ; where, being intermix'd with other Shrubs of the same Growth, they afford an agreeable Prospect.

These Shrubs are easily propagated from Suckers, which they send forth in great Plenty from the old Plants. These Suckers may be taken off any time in *February* or *March*, and planted in a Nursery, where they may be train'd up for two or three Years ; after which they may be remov'd to the Places where they are to remain. There is no very great Beauty in these Plants, but as their Leaves and Flowers are very different from most other Trees, so they make a pretty Variety in small Wilderness-Quarters ; or when planted in Clumps with various Trees, they will grow to be ten or twelve Feet high, but it is very rare to see them larger.

RHAMNUS : The Buckthorn.

The Characters are ;

It hath a Funnel-shap'd Flower, consisting of one Leaf, which is divided towards the Top into four or five Segments ; out of the Flower-cup rises the Pointal, which afterwards becomes a soft roundish Berry, very full of Juice, inclosing four hard Seeds, which are round and smooth on the Outside, but flattened on the other.

The Species are ;

1. *RHAMNUS* ; *Catharticus. C. B. P.* Common purging Buckthorn.

2. *RHAMNUS* ; *Catharticus, minor. C. B. P.* Lesser purging Buckthorn.

3. *RHAMNUS* ;

3. RHAMNUS; *spinis oblongis, cortice albo Montpellierensium*. J. B. Buckthorn with long Spines and a white Bark of Montpellier.

4. RHAMNUS; *Afer, folio pruni longiori, subrotundo, flore candicante, Spinis longissimis*. Boerb. Ind. alt. African Buckthorn with a longer roundish Plum Leaf, white Flowers, and very long Spines.

5. RHAMNUS; *Hispanicus, folio Buxi, minor. Tourn.* Lesser Spanish Buckthorn with a Box Leaf.

6. RHAMNUS; *Afer, Spinis longis, cortice albo, fructu caeruleo*. Boerb. Ind. African Buckthorn with long Spines, a white Bark, and blue Fruit.

The first of these Trees is very common in the Hedges, in divers Parts of England; the Berries of which are order'd by the College of Physicians for Medicinal Use; but particularly for making a Syrup, which was formerly in great Use, but of late the Persons who supply the Markets with these Berries, have gathered several other Sorts of Berries, which they have either mixed with those of the Buckthorn, or have wholly substituted them in their Place; these are the Berries of the *Frangula*, *Cornus Femina*, &c. which Mixture hath spoil'd the Syrup, and render'd it less esteem'd. But whoever purchases the Buckthorn Berries, may distinguish whether they are right or not, by opening them, and observing the Number of Seeds in each, for these have commonly four, whereas the *Frangula* has but two, and the *Cornus Femina* but one.

The second Sort is less common in England, and only to be found in Gardens where it is cultivated for Variety. Both these Sorts may be propagated by laying down their tender Branches, in Autumn, which, if duly water'd in dry Weather, the succeeding Summer, will take Root in the Compass of one Year, and may then be transplanted either where they are to remain, or in some Nursery, to be trained up for a few Years, and then removed to their Places of Growth.

The first Sort will grow to the Height of eighteen or twenty Feet, but being a straggling Grower, is seldom much cultivated in Gardens.

The second Sort seldom rises above five Feet high, and so should be planted amongst Shrubs of the same Growth, where it will add to the Variety, tho' it has little more Beauty than the former.

They may also be propagated by Seeds, which must be sown on a Bed of fresh Earth, soon after they are ripe; the Spring following the Plants will appear, when they must be carefully clean'd from Weeds; the Autumn following they may be transplanted out, and managed as the Layers.

The third Sort is commonly preserved in Green-houses, in England, but is hardy enough to bear the Cold of our ordinary Winters in the open Air, if planted in a dry Soil, and defended from cold Winds.

This Plant may be propagated by laying down the tender Branches in the Spring, which

if watered in dry Weather, will take Root before the Michaelmas following, at which Time they may be taken off and transplanted into Pots, fill'd with light fresh Earth, and in Winter placed in the Green house. But if the young Plants are designed for the full Ground, they should continue upon the old ones until Spring, at which Time they may be taken off, and transplanted where they are to remain.

It may also be propagated by planting Cuttings in May or June, upon a Bed of light fresh Earth, observing to water and shade 'em until they have taken Root; and during the Summer Season they must be kept clear from Weeds, and at Michaelmas they may be planted into Pots, as the Layers, or else permitted to remain until Spring, when they may be removed, as was directed before. There is no great Beauty in this Plant, but it is preserved in several Gardens for the Sake of Variety.

The fourth, fifth, and sixth Sorts are also preserved in several curious Gardens for Variety, but the fourth is the most beautiful of 'em all; this produces vast Quantities of purple Flowers, most part of Summer, and many times ripens its Seeds in England: These may all be propagated as the last Sort, and require to be housed in Winter, tho' they need only be shelter'd from the extrem Frost, but should have as much free Air as possible in mild Weather, and in Summer must be often watered. These delight in a fresh light Soil, and require to be often removed, because their Roots do greatly increase, so as to fill the Pots in a short Time.

RHUS, [*its* takes its Name of *flow*, because it stops dysenterical Fluxes of the Belly, and Womens Courses.] The Sumach Tree.

The Characters are;

The Flower consists of five Leaves, which are placed in a circular Order, and expand in Form of a Rose; from whose Flower-cup rises the Pointal, which afterwards becomes a roundish or almost Kidney-shap'd Vessel, containing one Seed of the same Shape: To which Marks may be added, the Flowers growing in Bunches, and the Leaves are either winged or have three Lobes.

The Species are;

1. RHUS; *Virginianum*. C. B. P. Virginian Sumach, by some falsely called The Stag's-horn-tree.

2. RHUS; *tennifolia Virginiana humilis*: *Rhus, angustifolium*. C. B. P. Pluk. Alm. Dwarf Virginian Sumach with narrow Leaves.

3. RHUS; *Africanum, trifoliatum, majus, foliis subtus argenteis, acutis & margine incis.* Pluk. Phyt. Great African three-leav'd Sumach, with narrow Leaves cut on their Edges, and white underneath.

4. RHUS; *Africanum, trifoliatum, minus, glabrum, splendens folio subrotundo, integro, forte Lentiscus Africanus triphyllus quorundam*. Pluk. Phyt. Lesser three-leav'd African Sumach, with a whole, roundish, shining, smooth Leaf.

5. RHUS;

5. *Rhus*; *Africanum*, *trifoliatum majus*, *folio subrotundo integro, molli & incano*. Pluk. Phyt. Greater three-leav'd African Sumach, with a whole, roundish, woolly Leaf.

The first of these Plants is pretty common in many Gardens near London, where it endures the severest Cold of the Winters in the open Air, and is usually intermix'd in small Wilderness Quarters, amongst other Trees of the like Growth, where it affords an agreeable Variety: This produces Tufts of small Flowers in June, at the Extremities of the Branches, which are succeeded by Seeds which are inclos'd in red Covers, so that the whole Spikes appear of a fine red Colour. These Tufts are sometimes used in Dying, and the Branches of the Tree are used for Tanning of Leather, in America, where these Trees grow in Plenty.

This Tree will grow to be eight or ten Feet high, but is very subject to produce crooked, unsightly Branches, so that it can't be reduc'd to a regular Stem, which renders it unfit to plant singly in an open Situation; but amongst other Trees, where the Deformity of the Stem is hid, it looks very well.

The second Sort is less common than the first, and only to be found in some very curious Gardens. This is like the first, in most respects, but is of much smaller Growth, and the Leaves are very narrow. Both these may be propagated in Plenty, from the great Quantity of Suckers which they produce from their Roots, which being taken off in March, and planted on a light sandy Soil, will, in a few Years, produce Flowers. They may also be propagated by laying down of the Branches, in the Spring of the Year, which will take Root in the Compass of one Season, and may then be taken off and transplanted where they are to remain.

The African Sorts are all preserv'd in Pots or Tubs, and housed in Winter; being too tender to endure the Cold of this Climate in the open Air. These may be propagated by laying down their young Branches into fresh Earth, observing to water them duly in dry Weather, which will greatly forward their Rooting: In one Year they will be fit to transplant, when they may be taken from the old Plants; and each placed in a separate Pot, fill'd with fresh light Earth. The best Time for transplanting of these Plants is in April, observing to water and shade them until they have taken Root, after which they may be exposed with Myrtles, Oleanders, and other hardy Exoticks, during the Summer Season, and in Winter must be housed with them, being equally as hardy, and only require to be screened from severe Frost.

These Plants do rarely produce Flowers in England, but as they retain their Leaves all the Winter, and may easily be reduced to a regular Head, so they are preserv'd for the Diversity of their Leaves, which adds to the Variety of a Green-house.

I shall take the Liberty of placing another Plant in this Place, which though very different in its Characters from those here men-

tion'd, yet as it is generally known, and has pass'd under the Title of *Rhus* for a great Number of Years, and has not, as yet, been reduced to any other Genus of Plants by the Botanists, that I know of, it may not be amiss to continue its old Name, since the Design of this Work is not to enter into the *Minutiae* of Botany, but to instruct how they may be cultivated in this Climate.

Rhus; *Myrtifolia*, *Monspeliaca*. C. B. P. The Myrtle-leav'd Sumach.

This is a low, shrubby Plant, which seldom rises above four Feet high in this Country, and is preserv'd by such who are curious in collecting the various Sorts of Trees and Shrubs; but there is no great Beauty in it: It may be propagated plentifully from the Suckers which arise from the Root, or by laying down the tender Branches, which do easily take Root, and may be transplanted either in October or March, into the Place where they are to remain. It is very hardy, and may be placed amongst other low Shrubs, in small Wilderness Quarters, to add to the Variety.

RIBES: The Currant-Tree.

The Characters are;

It hath no Prickles; the Leaves are large; the Flower consists of five Leaves, which are placed in a circular Order, and do expand in Form of a Rose; the Ovary, which arises from the Center of the Flower-cup, becomes a globular Fruit, which are produced in Bunches.

The Species are;

1. *RIBES*; *vulgaris*, *acidus*, *ruber*. J. B. Common red Currant.
2. *RIBES*; *major*, *fructu rubro*. H. Eyst. The large Dutch red Currant.
3. *RIBES*; *vulgaris*, *acidus*, *albus*, *baccas ferens*. J. B. Common white Currant.
4. *RIBES*; *quæ* *Grossularia*, *bortensis*, *major* *fructu albo*. H. R. Par. Large Dutch white Currant.
5. *RIBES*; *major*, *fructu carneo*. The Champaign Currant, *vulgô*.
6. *RIBES*; *Alpinus*, *dulcis*. J. B. The Gooseberry-leav'd Currant.
7. *RIBES*; *fructu parvo*. Merr. Pin. The small wild Currant.
8. *RIBES*; *nigrum* *vulgô dictum*, *folio olente*. J. B. The black Currant.
9. *RIBES*; *vulgaris*, *foliis ex luteo variegatis*. The yellow strip'd-leav'd Currant.
10. *RIBES*; *vulgaris*, *foliis ex albo eleganter variegatis*. The common Currant, with Leaves beautifully variegated with Green and White.
11. *RIBES*; *fructu albo*, *foliis ex albo variegatis*. The white Currant with strip'd Leaves.
12. *RIBES*; *Alpinus* *dulcis*, *foliis variegatis*. The strip'd Gooseberry-leav'd Currant.
13. *RIBES*; *fructu nigro*, *foliis variegatis*. The black Currant with strip'd Leaves.
14. *RIBES*; *Americana*, *fructu nigro*. The American black Currant.

The five first mention'd Sorts are preserv'd in all curious Gardens for the Sake of their

Fruits: Indeed of late Years, the common red and white Currants have been neglected, since the *Dutch* red and white have become plenty in *England*; these producing much larger and fairer Fruit to the Sight than the common Sorts, though I think the common Sorts are much better flavoured; so that they should not be entirely neglected by such as are curious in Fruits.

The sixth Sort is preserved as a Curiosity, by such who delight in Variety, but the Fruit is not valuable.

The seventh Sort is found wild in *England*. The Fruit of this Kind is small, and very tart, which renders it unworthy of being cultivated in Gardens.

The eighth Sort is preserved in some old Gardens, but the Fruit having a disagreeable, strong Taste, has occasioned its being but little cultivated of late Years.

Those Sorts with variegated Leaves are preserved by such as are fond of strip'd Plants; but as their greatest Beauty is only in the *Spring*, before their Leaves grow large, after which they become more green; so they are scarcely worth preserving in a Garden.

The fourteenth Sort was obtain'd by Mr. Peter Collinson from *America*, in whose fine Garden it has produced Fruit, and from thence hath been communicated to several other curious Gardens. The manner of this Plant's flowering is very different from the other Sorts of Currants, for which Variety it may have a Place amongst other Shrubs; but the Fruit being somewhat like our black Currant, is not much esteem'd.

All these Sorts may be easily propagated by planting their Cuttings any time from *September* to *March*, upon a Spot of fresh Earth, which in the *Spring* must be kept very clear from Weeds, and in very dry Weather if they are watered, it will greatly promote their Growth: These may remain two Years in this Nursery, during which time they must be pruned up for the Purposes design'd, *i. e.* either to clear Stems, if for Standards, or if for Walls, Pales, or Espaliers, they may be trained up flat.

Then they should be planted out where they are to remain; the best Season for which is soon after the Leaves begin to decay, that they may take Root before *Winter*, so that they may be in no Danger of suffering from Drought in the *Spring*.

These Plants are generally planted in Rows, at about ten Feet asunder, and four Distance in the Rows; but the best Method is to train them against low Espaliers, in which manner they will take up much less Room in a Garden, and their Fruit will be much fairer.

The Distance they should be placed for an Espalier, ought not to be less than eight Feet, that their Branches may be trained horizontally, which is of great Importance to their Bearing.

Those that are planted against Pales or Walls should also be allowed the same Distance; if they are planted against a South-East Wall or Pale, it will cause their Fruit to ripen at least a Fortnight or three Weeks sooner than those

in the open Air, and those which are planted against a North Wall or Pale, will be proportionably later; so that by this Method the Fruit may be continued a long Time in Perfection, especially if those against the North Pales are matted in the Heat of the Day.

These Plants produce their Fruit upon the former Year's Wood, and also upon small Snags which come out of the old Wood, so that in pruning 'em, these Snags should be preserved, and the young Shoots shortened in proportion to their Strength. The only Method, very necessary to be observed in pruning of them, is not to lay the Shoots too close, and never to prune their Snags to make 'em smooth; this, with a small Care in observing the Manner of their Growth, will be sufficient to instruct any Person how to manage this Plant, so as to produce great Quantities of Fruit.

These Plants will thrive and produce Fruit in almost any Soil or Situation, and are often planted under the Shade of Trees; but the Fruit is always best when they are planted to the open Air, and upon a dry Soil.

RICINOIDES: Physick-nut, *vulgô*.

The Characters are;

The Male Flowers consist of several Leaves, which are plied in a circular Order, and do expand in Form of a Rose; these are barren: At remote Distances from these Flowers, upon the same Plant, are produced the Embryo's, which are wrapt up in the Flower-cup, and afterwards do become tricapular Fruits, containing one oblong Seed in each Cell.

The Species are;

1. RICINOIDES; *Americana*, *Gossypii folio*. Tourn. American Physick-nut with a Cotton Leaf.
2. RICINOIDES; *arbor*, *Americana*, *folio multifido*. Tourn. Tree American Physick-nut, with a multifid Leaf, commonly called in the *West-Indies*, French Physick-nut.
3. RICINOIDES; *Americana*, *staphisagriae folio*. Tourn. American Physick-nut with a Staves-acre Leaf, called in the *West Indies*, Belly-ach-weed and Wild Cafada.
4. RICINOIDES; *Americana*, *Aleagni folio*. Plum. American Physick-nut with a wild Olive Leaf.

These Plants are very common in the warm Parts of *America*. The first Sort is planted in Hedges, in most Parts of *Jamaica* and *Barbadoes*, and is propagated by Slips or Cuttings, which will take Root very freely, and do make a good Fence in a short Time, being very quick of Growth. This rises to be twenty Feet high, and produces a great Quantity of Nuts, which are given from three to seven, for a Vomit; but if the thin Film be taken off, they may be eaten in Quantities without any ill Effect. There is an Oil drawn from these Seeds, which is used for burning in Lamps.

The second Sort is cultivated in Gardens in *Jamaica* and *Barbadoes*, for the Beauty of its Flowers, which are of a fine scarlet Colour, and produced in large Bunches on diver

Part

Parts of the Plant. The Nuts of this Kind are larger than the other, but have much the same Quality. This is not a Native in any of the English Settlements in the West-Indies, but was brought thither either from the Spanish or French Settlements, from whence it had the Names of French and Spanish Physick-Nut.

The third Sort is very common in the Savannas in Jamaica and Barbadoes; the Seed of this Kind is the common Physick among the poorer Sort, for the dry Belly-ach.

The fourth Sort grows plentifully upon the Sea-Coast in divers Parts of the West-Indies, and is sometimes brought into England as a Curiosity; where, in some very good Gardens, it is preserved with the former Sorts.

These may be all propagated by sowing their Seeds upon a Hot-bed in the Spring, and when the Plants are come up, they should be each transplanted into a separate Pot, fill'd with light fresh Earth, and plunged into a Hot-bed of Tanners-bark, observing to shade 'em until they have taken Root, after which they should have Air and Water in Proportion to the Warmth of the Season, and the Hot-bed in which they are placed.

When their Roots have filled these Pots, they should be shaken out, and put into larger Pots, filled with the same fresh Earth, and plunged again into the Hot-bed; and so, from time to time, as the Plants advance, they should be shifted into larger Pots, and when they are too high to be contained under a Frame, they should be removed into the Bark-Stove, where they may have Room to advance in Height, observing to water them duly, as they may require it; which if constantly performed, and the Plants kept in a warm Bed, they will grow three or four Feet high the first Summer, and divide into several Branches in Winter.

These Plants must be placed in a Bark-Stove, (with other Plants which are the Produce of the same Countries) during which Season they should be often refresh'd with Water, and the Stove should be kept up to Anana's Heat, (as mark'd on Mr. Fowler's Thermometers); in this they will continue flourishing all the Winter, and early the next Spring will produce Flowers, which will be succeeded by Fruit.

These Plants, if thus managed, will continue several Years, and annually produce a great Number of Flowers and Fruit, so that they are worthy of a Place in every curious Collection of Exotick Plants.

RICINUS, [so call'd because the Seed resembles (*Ricinus*) the Animal call'd by that Name, i. e. a Tick, which infests Dogs and Oxen. It is also call'd *Palma Christi*, because its Leaves are said to resemble the Palm of the Hand.] *Palma Christi, vulgô.*

The Characters are;

The Flowers are apetalous, (i. e. have no Leaves) consisting of many Stamina, which arise in the Center of the Flower-cup; these are barren; for the Embryo's are produced at remote Distances, upon the same Plant, which

afterwards become triangular Fruits, having three Cells, in each of which is contained one oblong Seed, which has a hard Shell.

The Species are;

1. **RICINUS**; *vulgaris*. C. B. P. The common *Palma Christi*, commonly known in the West-Indies by the Name of Oil-Nut, or *Agnus Castus*.

2. **RICINUS**; *vulgaris, minor*. C. B. P. *caule rutilante*. The lesser *Palma Christi* with reddish Stalks, commonly called in Barbadoes, Red Oil Seed.

3. **RICINUS**; *vulgaris, minor*. C. B. P. *caule virescente*. Lesser *Palma Christi* with green Stalks, commonly called White Oil Seeds in Barbadoes.

4. **RICINUS**; *Americanus, major, caule virescente*. H. R. P. The greater *Palma Christi* with green Stalks.

5. **RICINUS**; *Africanus, maximus, caule geniculato rutilante*. H. R. Par. The greatest African *Palma Christi* with reddish jointed Stalks.

These Plants are very common in divers Parts of Africa and America, and some of them are also found in the warm Parts of Europe; but in England they are preserved with great Care in several curious Gardens.

The first Sort has been a long Time in this Country, but was formerly treated as an annual Plant, whereas if it be preserved in a good Green-house, it will abide two or three Years, and become a large Plant.

The second and third Sorts do grow promiscuously all over America, where their Seeds are gathered to draw an Oil from them, for the use of Lamps; these Seeds are frequently sent into England, intermixed with each other.

The fourth Sort is also very common in America, growing promiscuously with the common Sort; the Seeds of both being gather'd indifferently to draw an Oil from them.

The fifth Sort, tho' mention'd to be a Native of Africa, yet is also very common in divers Parts of America, from whence I have several times receiv'd the Seeds. This produces very large Leaves and Seeds, and will grow to a large Size if planted in a rich Soil. I have measur'd one of the Leaves of this Plant (which was growing near Chelsea) which was upward of two Feet Diameter, and the Stem was as large as a middle-siz'd Broom-staff, tho' but of one Summer's Growth.

These Plants may be propagated by sowing their Seeds upon a Hot-bed; and when they are come up, they should be each planted into a separate Pot fill'd with light fresh Earth, and plung'd into a fresh Hot-bed, observing to water and shade them until they have taken Root; after which they must have a great Share of free Air, when the Season is mild, otherwise they will draw up tall, and be very weak: And as these Plants grow very fast, so their Roots will in a short time fill the Pots, therefore they should be shifted into larger Pots fill'd with the like fresh Earth; and toward the latter End of May, when the Season is warm, they may be harden'd to endure the open

open Air by degrees; and then, if they are planted out into a very rich Border, and in dry Weather duly water'd, they will grow to a very large Size, particularly the first Sort, which I have seen upwards of ten Feet high in one Season; and these Plants have produc'd a great Quantity of Flowers and Seeds: But if you intend to preserve them through the Winter, they must never be plac'd in the full Ground, because after their Roots have been widely extended, there will be no transplanting them with Safety; therefore the best Way is to shift them into larger Pots from time to time as their Roots shall require, placing them in the open Air during the *Summer* Season, in some warm Situation, where they may remain until *October*, when they must be remov'd into the House with other Exotick Plants, observing duly to water them in *Winter*, and let them have free Air in mild Weather, for they only require to be protected from Frost and cold Winds, so that they will endure the *Winter* in a common Green-house without any Addition of artificial Warmth.

The first four Sorts will perfect their Seeds the first Season in this Climate, provided they are sown early in the *Spring*, but the fifth Sort will rarely produce any till the second Year; so that there is a Necessity of preserving this through the *Winter*, otherwise it cannot be maintain'd in *England*.

These Plants do deserve a Place in every curious Garden for the singular Beauty of their Leaves, (notwithstanding their Flowers are not very valuable) especially those Sorts which may be propagated every Year from Seeds, because those Persons who have no Green-house to place them into in *Winter*, may cultivate them as other annual Plants; amongst which these being plac'd either in Pots or Borders, do afford an agreeable Variety: But it must be observ'd, as these are large growing Plants, never to place them too near other Plants of less Growth, because these will overbear and destroy them; and those which are planted in Pots should be allow'd Room for their Roots to expand, and must be frequently water'd, otherwise they will not grow very large.

RIPENING of FRUIT.

The Method of producing Early Fruits.

A Wall should be erected ten Feet high, and in Length according to the Number of Trees intended for three Years Forcing.

This being done, a Border may be mark'd out about four Feet wide on the South-side of it, and some Scantlings of Wood about four Inches thick, must be fasten'd to the Ground in a strait Line on the Outside of the Border to rest the Glass Lights upon; which Lights are to slope backwards to the Wall, to shelter the Fruit as there shall be Occasion.

Bars about four Inches wide, cut out of whole Deal, must be plac'd between these Glasses, so that the Lights may rest on them.

If you would not have the Glass-Lights slope so much as they will from this Fall from

the Upright, then you may have a Line of whole Deals fix'd on the Top of the Wall to project their whole Breadth over the Trees, and made so that the Top of the Glass Lights may fall in an Inch or two under them: There must also be a Door shap'd to the Profile of the Frame at each End, that it may be open'd at either of the Ends, according as the Wind blows.

The Frame beforemention'd should be made so, that when the first Part has been forc'd, the Frame may be mov'd the next Year forward, and the succeeding Year forward again; so that the Trees will be forc'd but every third Year; and having two Years to recover themselves, will continue strong for many Years.

These Trees should be well grown before they are forc'd, otherwise they will soon be destroy'd, and the Fruit produc'd on grown Trees will be much fairer and better tasted than on fresh-planted Trees.

The Fruit that may be planted in these Frames are,

The Avant, the Albemarle, the Ann, the Early Newington and Brown Nutmeg Peaches.

Mr. Fairchild's Early, the Etruge and Newington Nectarines; the Masculine Apricock; the May Duke and May Cherry.

As for Grapes; the *White* and *Black Sweet-water.*

Gooseberries; the Dutch White, the Dutch Early Green, and the Walnut-Gooseberries.

Currants; the large Dutch White, the large Dutch Red Currants.

It has been found by Experience, that the Trees will be injur'd, if the Heat be apply'd before *November*: And that the Time for applying the Heat for bringing either *Duke* or *May Cherries*, is about the Middle or latter End of that Month, and applying Heat at the same time would do for *Apricocks*; so that the *Masculine Apricock* will, in *February*, be as large as *Duke Cherries*, and will be ripe by the Beginning of *April*.

Cherries thus forc'd will not hold so well as *Apricocks*, tho' the former will last, perhaps, for seven Years in good Plight; but *Apricocks* will thrive and prosper thus many Years.

It is very likely that *Mr. Fairchild's Early Nectarines* would ripen much about the same time as the *Masculine Apricock*, if they were both forc'd at the same time; and the *Brugnou Nectarine* would follow that. As to the forward Sorts of *Plums*, they have been try'd, and do ripen about the latter End of *April*.

Gooseberries would produce green Fruit fit for Tarts in *January* and *February*, and probably would ripen about the End of *March* or the Beginning of *April* at the farthest.

Currants, which tend to shoot forward, might, by the same Heat that brings *Cherries* in *February*, be forc'd to produce ripe Fruit in *April*, if not sooner.

As for the Distance of these Trees one from another, it need not be so great as is directed for those planted in the open Air, because they will never shoot so vigorously, therefore eight or nine Feet will be sufficient.

The higher Parts of the Wall being furnish'd with *Apricocks*, *Cherries*, *Nectarines*, *Peaches* and *Plums*, the lower small Space between them may be fill'd up with *Currants*, *Gooseberries* and *Roses*.

As to the Pruning of these Trees :

The Time of doing it in these Frames, must not be the same as in other Trees ; because in the common Case of *Stone-Fruit* against Walls, the *Spring* does not begin till the End of *January* ; but in the forcing Frames, the *Spring* begins in *November* : Therefore they should be prun'd three Weeks before the Heat is apply'd ; for then the Air will be so artificially temper'd, as to set the Trees a growing, and the Frosts cannot come at them, if the Glasses be set up as soon as they are prun'd.

As to the nailing of these Trees :

Every Branch that shoots must be laid as close to the Wall as can be ; for the Fruit which touches the Wall will be ripe a Month sooner than those that lie but two Inches from it.

Sometimes it happens that the Tops of such Trees have Blossoms a Month or six Weeks before the Bottom ; and sometimes one Branch has been full of Blossoms, when there have been half a Score or more Branches of the same Tree which have not stirr'd till the Fruit of the first Blossoms has been almost ripe, notwithstanding which the Tree has done very well : And it is no uncommon Thing for such Trees to have *Fruit ripening* upon them for near three Months continually.

As for *Gooseberries* ; such Plants as are planted in these Frames, should be such as have spread ; and when as many Shoots have been nail'd to the Wall as may conveniently be done, others may be left at a Distance from it, to succeed them in *ripening*.

If they are taken up in the *Summer*, and properly manag'd, they will bear Fruit the first Year, as well as if they had not been transplanted.

The *Currants* may be order'd after the same Manner, and also the *Roses* : And the best kind of *Rose* for this Purpose, is the *Monthly Rose*, which ought always to be topped about the End of *July* or the Beginning of *August*, to make them put out a good Number of Flower-buds.

As to the laying the Dung to the Wall ;

The Dung, before it be laid to the Back of the Wall, should be thrown up in an Heap, and lie for some Days, that it may yield an equal Heat every where, and be constant.

When it has been thus prepar'd, it should be laid about four Feet thick at the Base, and so sloping, till it has but two Feet wide at the Top.

It should be laid at first within four Inches of the Top of the Wall, for it will sink to about three Feet in six Weeks time ; and then some fresh Dung must be laid, because the first Heat will not do much more than swell the Buds of the Trees, or begin to bring them to a green Colour, or at the most will but barely shew the Colour of the Blossom-Buds.

But according as the Frosts shall have happen'd to have had more or less Influence over the Buds, this will happen sooner or later.

If these Trees be cover'd with the Glasses, it will contribute very much to forward their Blossoming ; for tho' their Blossoms will not be destroy'd by the Frosts, yet the more the Frosts come at them, they will both be the drier, and more hard to open.

If the Weather be tolerably mild, the Trees ought not to be hinder'd from the Benefit of the Showers till the Buds begin to stir ; but afterwards the Glasses should be kept constantly over them till the Influence of the Sun is something considerable.

But the Doors which are at each End of the Frame, should, in the mean time, be set open, when the Wind does not blow too sharp, and the Sun shines any thing warm : And if this does not happen in the Space of a Fortnight, then the Doors at both Ends may be open'd, and Mats of Bais or Canvass should be hung up over the Door-ways to correct the Winds, and give the Air leave to circulate in the Frames.

As for *Cherries* ; about three Changes of Dung will be sufficient to bring them to a due Ripeness in *February*, supposing each Parcel remains a Month at the Back of the Wall.

But as for *Apricocks*, *Grapes*, *Nectarines*, *Peaches* and *Plums*, if *April* proves cold, the forcing Heat must be continu'd till *May* is settled ; but some of the Glasses should be open'd in the Morning, in *March* and *April*, when the Wind is still, and the Sun warm ; and they should be permitted to receive the Showers that fall, while the Fruit is growing ; but while they are in Blossom no Rain should come near them, because if there should be any Moisture lodg'd in the Bosom of the Flowers, and the Sun should shine hot thro' the Glasses, it would be apt to destroy them.

The Dung that comes from these Frames having lost its Heat, may be laid in Heaps to rot for the meliorating of stubborn Grounds.

Another thing which ought to be observ'd in planting *Fruit* in these Frames, is to plant those *Fruit* which come forward together, and those which come late by themselves, because it will be prejudicial to the forward *Fruit* to give them any more Heat when they have done bearing ; when at the same time the later Fruits set amongst them may require more Heat, and to be continued longer ; some of them, perhaps, requiring an artificial Heat till *May*.

There may also a Row or two of *Scarlet Strawberries* be planted near to the Back of this Frame ; and these you may expect will be ripe by the End of *February* or Beginning of *March*.

As for the *Vines*, they may probably be brought to Blossom, and have ripe *Grapes* in *May*.

There may also be here and there planted a *Monthly Rose tree*, and *Hyacinths*, *Jonquils*, *Narcissus's*, *Polyanthus's*, and also early *Tulips* might be planted in the Borders.

A **ROOT** is that Part of a Plant by which it naturally draws in its Nourishment. The **Roots** of Plants being of various Forms, and each distinguish'd by a different Name, it will not be improper in this Place to insert the principal Part of those which are distinguish'd. And first,

A **fibrose Root** is that which consists wholly of small Fibres; as most Sorts of *Grass*, *Pinks*, &c.

A **tuberosc Root** is that which consists of an uniform fleshy Substance, and is of a roundish Figure; as *Turnips*, *Potatoes*, &c.

A **bulbous Root** is that which consists either of several Coats involving one another; as *Onions*, *Tulips*, &c. or of several Scales lying over one another; as *Lilies*, *Crown Imperials*, &c. The first of these is called a **tunicated Root**; the last a **squamose Root**.

A **testiculated Root** is a double tuberosc Root, for it consists of two Knobs, resembling a Pair of Testicles, as in the *Orchis*.

A **handed Root** is a tuberosc Root, divided as it were into several Fingers; as in the *handed Satyrions*.

A **grumous Root** is that which is compos'd of several Knobs; as the *Anemone*, &c.

A **granulous Root** is a kind of grumous Root with small Knobs resembling so many Grains of Corn; as in the *White Saxifrage*.

A **Tap-Root** is a tuberosc Root extended in Length; as in *Parsnips*, *Carrots*, &c.

ROSA; The Rose-Tree.

The **Characters** are;

The **Flower** is compos'd of several **Leaves**, which are plac'd circularly, and do expand in a beautiful Order; whose leafy Flower-cup afterwards becomes a roundish or oblong fleshy Fruit, inclosing several angular bairy Seeds: To which may be added, It is a weak, pithy Shrub, for the most part beset with Prickles, and hath pinnated Leaves.

The **Species** are;

1. ROSA; *sylvestris, inodora, seu canina*. Park. Theat. The Wild Briar, Dog Rose, or Hep Tree.

2. ROSA; *sylvestris, fructu majore, hispido*. Raii Syn. Wild Briar or Dog Rose, with large prickly Heps.

3. ROSA; *sylvestris, pomifera major, nostras*. Raii Syn. The greater English Apple-bearing Rose.

4. ROSA; *pumilla, spinosissima, foliis pimpinellæ glabris, flore albo*. J. B. The Dwarf Wild Burnet-leav'd Rose.

5. ROSA; *pumilla, spinosissima, foliis pimpinellæ glabris, ex luteo & viridi eleganter variegatis*. The Dwarf Wild Burnet-leav'd Rose, with variegated Leaves.

6. ROSA; *pimpinella minor, Scotica, floribus ex albo & carneo eleganter variegatis*. Pluk. Alm. The strip'd Scotch Rose.

7. ROSA; *sylvestris, foliis odoratis*. C. B. P. The Sweet-Briar or Eglantine.

8. ROSA; *sylvestris odora, five Eglanteria, flore duplici*. Park. Parad. Sweet-Briar, with a double Flower.

9. ROSA; *rubra, multiplex*. C. B. P. The double Red Rose.

10. ROSA; *Damascena*. Park. Parad. The Damask Rose.

11. ROSA; *Provincialis, five Hollandica, Damascena*. Park. Parad. The Damask Provence Rose.

12. ROSA; *Provincialis, major, flore pleno, ruberrimo*. Boerb. Ind. Alt. The Red Provence Rose.

13. ROSA; *centifolia, Batavica*. Clus. H. The Dutch Hundred-leav'd Rose.

14. ROSA; *Provincialis spinosissima, pedunculo muscoso*. The Moss Provence Rose.

15. ROSA; *Provincialis, rubra*. Park. Parad. The Common Provence Rose.

16. ROSA; *holosericea, simplex*. Park. Parad. The single Velvet Rose.

17. ROSA; *holosericea, multiplex*. Park. Parad. The double Velvet Rose.

18. ROSA; *odore Cinnamoni, flore pleno*. C. B. P. The double Cinnamon Rose.

19. ROSA; *odore Cinnamoni, simplex*. C. B. P. The single Cinnamon Rose.

20. ROSA; *lutea, simplex*. C. B. P. The single Yellow Rose.

21. ROSA; *lutea, multiplex*. C. B. P. The double Yellow Rose.

22. ROSA; *sylvestris, Austriaca, flore Phœnicio*. Park. Theat. The Austrian Rose.

23. ROSA; *sylvestris, Austriaca, flore totum luteum*. The Yellow Austrian Rose.

24. ROSA; *uno ramo luteos, cæteris pruniceos, flores gerens simplices*. Boerb. Ind. Alt. The Austrian Rose, with yellow Flowers upon one Branch, and purple Flowers on the other.

25. ROSA; *alba, vulgaris major*. C. B. P. The common White Rose.

26. ROSA; *alba, minor*. C. B. P. The lesser White Rose.

27. ROSA; *candida, semiplena*. J. B. The semi-double White Rose.

28. ROSA; *incarnata*. Park. Parad. The Blush Rose.

29. ROSA; *Prænestina, variegata, plena*. Hort. Eyst. The York Lancaster Rose.

30. ROSA; *rubro & albo variegata, Rosa Mundi, vulgò dicta*. Raii Hist. The Rose of the World, or Rosa Mundi.

31. ROSA; *Francofurtensis*. Park. Parad. The Frankfort Rose.

32. ROSA; *sempervirens*. Park. Parad. The Ever-green Rose.

33. ROSA; *omnium Calendarum*. H. R. Par. The Monthly Rose.

34. ROSA; *omnium Calendarum, flore variegato*; The strip'd Monthly Rose.

35. ROSA; *sine spinis, flore minore*. C. B. P. The Rose without Thorns.

36. ROSA; *sine spinis, flore majore ruberrimo*. The Royal Virgin Rose.

37. ROSA; *sylvestris, Virginienfis*. Raii Hist. The Wild Virginian Rose.

38. ROSA; *moschata, simplici flore*. C. B. P. The single Musk Rose.

39. ROSA; *moschata, flore pleno*. C. B. P. The double Musk Rose.

40. ROSA; *moschata, sempervirens*. C. B. P. The Ever-green Musk Rose.

41. ROSA;

41. *Rosa*; *Belgica*, *five vitrea*, *flore rubro*. *Rea. Flor.* The Red Belgick Rose.

42. *Rosa*; *Belgica*, *five vitrea*, *flore rubicante*. *Rea. Flor.* The Blush Belgick Rose.

43. *Rosa*; *marmorea*. *Rea. Flor.* The marbled Rose.

44. *Rosa*; *Provincialis*, *flore simplici*. The single Provence Rose.

45. *Rosa*; *Damascena*, *flore simplici*. The single Damask Rose.

46. *Rosa*; *pimpinella minor*, *Scotica*, *flore livide rubente*. The Dwarf Scotch Rose, with a blueish red Flower.

The first Sort of *Rose* grows wild in the Hedges in most Parts of *England*: The Fruit of this Tree is made into a Conserve for Medicinal Use; but this is seldom cultivated in Gardens.

The second, third and fourth Sorts do also grow wild in divers Parts of *England*, and are rarely preserv'd in Gardens, unless for Variety Sake.

The fifth Sort is a Variety of the fourth, and is preserv'd by some for the Beauty of its strip'd Leaves.

The sixth Sort is found wild in *Scotland*, and has been by many suppos'd to be the same as the fourth Sort, but only differing therefrom in having variegated Flowers; which is a great Mistake, for I have observ'd, where the two Sorts were cultivated on the same Soil for many Years, and yet retain'd a considerable Difference in the Size of the Plants, the *Scotch* Sort being not half so large as the other, yet the Flowers were much larger, the Leaves were less, and the Branches much weaker than those of the fourth Sort.

The last Sort here mention'd, was rais'd from the Seeds of the *Scotch Rose*; and altho' the Flowers were plain colour'd, yet the whole Appearance of the Plant continues the same as the original Kind, which is a plain Proof of its being different from the fourth Sort.

The *Sweet-Briar*, although wild in some Parts of *England*, yet is preserv'd in most curious Gardens for the extreme Sweetness of its Leaves, which perfumes the circumambient Air in the *Spring* of the Year, especially after a Shower of Rain. The Flowers of this Sort being single, are not valued, but the Branches of the Shrubs are cut to intermix with Flowers to place in *Basons* to adorn Halls, Parlours, &c. in the *Spring* of the Year, the Scent of this Plant being agreeable to most Persons.

The Double-flower'd *Sweet-Briar* is preserv'd on the Account of its beautiful Flowers, as well as for the Sweetness of its green Leaves.

All the other Sorts of *Roses* are originally of foreign Growth, but are hardy enough to endure the Cold of our Climate in the open Air, and produce the most beautiful and fragrant Flowers of any kind of Shrubs yet known: This, together with their long Continuance in Flower, has justly render'd them the most valuable of all the Sorts of flowering Shrubs, besides the great Variety of different Sorts of *Roses*, do make a Collection of Flowers, either for *Basons* or in the Garden, without

any other additional Mixture; and their Scent being the most inoffensive Sweet, is generally esteem'd by most Persons.

But in order to continue these Beauties longer than they are naturally dispos'd to last, it is proper to plant some of the monthly *Roses* near a warm Wall, which will occasion their Budding at least three Weeks or a Month before those in the open Air; and if you give them the Help of a Glass before them, it will bring their Flowers much forwarder, especially where Dung is plac'd to the Backside of the Wall, (as is practis'd in raising Early Fruits): By this Method I have seen fair *Roses* of this Kind blown in *February*, and they may be brought much sooner, where People are curious this Way.

You should also cut off the Tops of such Shoots which have been produc'd the same *Spring*, early in *May*, from some of these Sorts of *Roses* which are planted in the open Air, and upon a strong Soil: This will cause them to make new Shoots, which will flower late in *Autumn*; as will also the late removing the Plants in *Spring*, provided they do not suffer by Drought, as I have several times experienc'd; but particularly in the Year 1718, when I had occasion to remove a large Parcel of these Plants in *May*, just as they were beginning to flower: In doing of which, I cut off all the Flower-buds, and after having open'd a Trench in the Place where they were to be planted, I poured a large Quantity of Water, so as to render the Ground like a *Pap*; then I took up the Plants, and plac'd them therein as soon as possible, that their Roots might not dry; and after planting them I water'd the Ground well again, and cover'd the Surface over with *Mulch*, to prevent its drying; after this I repeated watering the Plants all over two or three times a Week in the Evening, until they had taken Root: In about three Weeks time, the Plants shot out again, and produc'd a great Quantity of Flowers in *August* and *September*, which were as fair as those produc'd in *June*. This is the only Sort of *Rose* for this Purpose, there being no other Sort which will flower both early and late except this.

The next Sort of *Rose* which flowers in the open Air, is the *Cinnamon*, which is immediately follow'd by the *Damask Rose*; then the *Blush*, and *Tork*, and *Lancaster* come; after which, the *Provence*, *Dutch Hundred leav'd White*, and most other Sorts of *Roses* do follow; and the latest Sorts are the two *Musk Roses*, which, if planted in a shady Situation, do seldom flower until *September*; and if the *Autumn* proves mild, will continue often till the Middle of *October*.

The Plants of these two Sorts should be placed against a Wall, *Pale*, or other Building, that their Branches may be supported; otherwise, they are so slender and weak as to trail upon the Ground; these Plants should not be pruned until *Spring*, because their Branches are somewhat tender, so that when they are cut in *Winter* they often die after the Knife. These produce their Flowers at the

Extremity

Extremity of the same Year's Shoots, in large Bunches, so that their Branches must not be shortened in the *Summer*, lest hereby the Flowers should be cut off. These Shrubs will grow to be eight or nine Feet high, and must not be check'd in their Growth, if you intend they should flower well, so that they should be placed where they may be allowed Room.

The lowest Shrub of all the Sorts here-mention'd, is the *Scotch Rose*, which rarely grows above two Feet high, so that this must be placed among other Shrubs of the same Growth. The *Red Rose* and the *Rosa Mundi* do commonly grow from three to four Feet high, but seldom exceed that; but the *Damask*, *Provence*, and *Frankfort Roses* grow to the Height of seven or eight Feet; so that in Planting of them, great Care should be taken, to place their several Kinds, according to their various Growths, amongst other Shrubs, that they may appear beautiful to the Eye.

The *Frankfort Rose* is of little Value, except for a Stock, to bud the more tender Sorts of *Roses* upon, for the Flowers do seldom open fair, and have no Scent; but it being a vigorous Shooter, renders it proper for Stocks to bud the *Tellow* and *Austrian Roses*, which will render them stronger than upon their own Stocks; but the *Tellow Roses* do seldom blow fair within eight or ten Miles of *London*, tho' in the Northern Parts of *Great-Britain*, they do flower extremely well. This Sort must have a Northern Exposure, for if it is planted too warm, it will not flower.

All the Sorts of *Roses* may be propagated either from Suckers, Layers, or by budding them upon Stocks of other Sorts of *Roses*, which latter Method is only practis'd for some peculiar Sorts, which do not grow very vigorous upon their own Stocks, and send forth Suckers very sparingly; or where a Person is willing to have more Sorts than one upon the same Plant; but then it must be observed, to bud such Sorts upon the same Stock as are nearly equal in their manner of Growth; for if there be a Bud of a vigorous growing Sort, and some others of weak Growth, the strong one will draw all the Nourishment from the weaker, and entirely starve them.

The best Sort for Stocks is the *Frankfort Rose*, which is a vigorous Grower, and produces strong, clean Shoots, which will take the Buds much better than any other Sort of *Rose*; but you must be very careful to keep the Stock after Budding intirely clear from Suckers or Shoots at the Bottom, for if they are permitted to remain on, they will, in a short time, starve the Buds. The best Season for budding of *Roses* is in *June*; the Manner of doing it, being the same as for Fruit-Trees, need not be repeated here.

If you would propagate them from Suckers, they should be taken off annually in *October*, and transplanted out either into a Nursery in Rows, as hath been directed for several other Sorts of flowering Shrubs) or into the Places where they are to remain; for if they are permitted to stand upon the Roots of the old Plants more than one Year, they grow woody,

and do not form so good Roots as if planted out the first Year, and so there is more Danger of their not succeeding.

But the best Method to obtain good rooted Plants, is to lay down the young Branches in *Autumn*, which will take good Root by the *Autumn* following, (especially if they are water'd in very dry Weather); when they may be taken from the old Plants, and transplanted where they are to remain. These Plants may be transplanted any time from *October* to *April*; but when they are design'd to flower strong the first Year after planting, they should be planted early; though, as I said before, if they are planted late in the *Spring*, it will cause them to flower in *Autumn*, provided they do not suffer by Drought.

Most of these Sorts do delight in a rich moist Soil, and an open Situation, in which they will produce a greater Quantity of Flowers, and those much fairer than when they are upon a dry Soil, or in a shady Situation. The pruning which they require, is only to have their dead Wood cut out, and the Suckers clear'd off, which should be done every *Autumn*; and if there are any very luxuriant Branches which draw the Nourishment from the other Parts of the Plant, they should be taken out or shorten'd, to cause it to produce more Branches, if there be occasion for them to supply a Vacancy; but you must avoid crowding them with Branches, which is as injurious to these Plants as to Fruit-Trees; for if the Branches have not an equal Benefit of the Sun and Air, they will not produce their Flowers so strong, nor in so great Plenty as when they are more open and better expos'd to the Sun, so that the Air may circulate the more freely between them.

ROSA SINENSIS; vide *Ketmia Sinensis*.

ROSE THE GUILDER; vide *Opulus*.

ROSE-TREE; vide *Rosa*.

ROSEMARY; vide *Rosmarinus*.

ROSMARINUS; so call'd of *Ros*, Dew, and *Marinus*, Lat. belonging to the Sea, q. d. Sea-Dew, as some say, because formerly growing in great Plenty near the Shore of the *Mediterranean Sea*, the Vapours thence arising, used to fall on it in the Manner of Dew.] *Rosemary*.

The Characters are;

It is a verticillate Plant, with a labiated Flower, consisting of one Leaf, whose Upper-lip or Crest is cut into two Parts, and turns up backwards, with crooked Stamina (or Chirves); but the Under-lip (or Beard) is divided into three Parts, the middle Segment being hollow like a Spoon; out of the two or three-tee-bed Flower-cup rises the Pointal, attended as it were by four Embryo's, which afterwards turn to so many Seeds, that are roundish, and are inclos'd in the Flower-cup.

The Species are;

1. ROSMARINUS; *bortensis*, *latiore folio*. *Mor. Hist.* Broad-leav'd Garden *Rosemary*.

2. ROSMARINUS; *bortensis*, *angustiore folio*. C.B.P. Narrow-leav'd Garden *Rosemary*.

3. ROSMA-

3. ROSMARINUS; *striatus, five aureus*. Park. Theat. The Gold-strip'd Rosemary.

4. ROSMARINUS; *bortensis, angustiore folio, argenteus*. H. R. Par. The narrow-leav'd Silver-strip'd Rosemary.

5. ROSMARINUS; *Almeriensis, flore majore, spicato purpurascens*. Fourn. Rosemary of Almeria, with a large spiked purplish Flower.

6. ROSMARINUS; *spontaneus, folio eleganter variegato*. Boerb. Ind. Broad-leav'd Rosemary, with an elegant strip'd Leaf.

These Plants grow plentifully in the Southern Parts of France, in Spain and Italy, where, upon dry rocky Soils near the Sea, they thrive prodigiously; but notwithstanding they are produc'd in warm Countries, yet they are hardly enough to bear the Cold of our ordinary Winters very well in the open Air, provided they are planted upon a poor, dry, gravelly Soil; on which they will endure the Cold much better than upon a richer Soil, where the Plants will grow more vigorously in Summer, and so be more subject to Injury from Frost, and they will not have so strong an Aromatick Scent as those upon a dry barren Soil.

Those Sorts with strip'd Leaves are somewhat tender, and should either be planted near a warm Wall, or in Pots fill'd with light fresh Earth, and shelter'd in Winter under a Frame, otherwise they will be subject to die in frosty Weather.

All these Sorts may be propagated by planting Slips or Cuttings of them in the Spring of the Year, upon a Bed of a light fresh Earth; and when they are rooted, they may be transplanted into the Places where they are design'd to grow, but it will be proper to do this about the Beginning of August, that they may take new Root before the frosty Weather comes on; for if they are planted too late in Autumn, they seldom live through the Winter, especially if the Weather proves very cold; so that if you do not transplant them early, it will be the better Method to let them remain unremoved until March following, when the Frost is over, observing never to transplant them at a Season when the dry East Winds blow, but rather defer the doing of it until the Season is more favourable; for if they are planted when there are cold drying Winds, they are apt to dry up their Leaves, and kill 'em: But if there happens to be some warm Showers soon after they are removed, it will cause 'em to take Root immediately; so that they will require no farther Care, but to keep them clear from Weeds.

Altho' these Plants are tender when planted in a Garden, yet when they are by Accident rooted in a Wall, (as I have several times seen 'em) they will endure the greatest Cold of our Winters, though expos'd much to the cold Winds; which is occasioned by the Plant's being more stunted and strong, and their Roots being drier.

The Flowers of the narrow-leav'd Garden Sort are used in Medicine, as are also the Leaves and Seeds.

RUBIA, [takes its Name from its red Co-

lour, because the Root of this Plant is used in dying a red Colour.] Madder.

The Characters are;

The Flower consists of one single Leaf, which is cut into four or five Segments, and expanded at the Top; the Flower-cup afterwards becomes a Fruit composed of two juicy Berries, closely joined together, containing Seed, for the most part hollowed like a Navel; to which may be added, the Leaves being rough, and surrounding the Stalks in Whorles.

The Species are;

1. RUBIA; *Tinctorum sativa*. C. B. P. Cultivated Dyers Madder.

2. RUBIA; *sylvestris aspera, quæ sylvestris Dioscoridis*. C. B. P. Wild Madder.

3. RUBIA; *sylvestris, Monspelulana, major*. J. B. Great wild Madder of Montpelier.

The first of these Sorts was formerly cultivated in divers Parts of England, for the Dyers Use; but of late Years it has been wholly neglected, so that at present I believe there is scarce any of it cultivated, except in small Quantities for Medicinal Use: How this Plant came to be so much neglected in England I can't imagine, since it will thrive as well here as in any Country in Europe; and the Consumption of it in England is pretty large; for I have been informed, that we pay upwards of thirty thousand Pounds annually for this Commodity, which might be easily sav'd to the Nation, were it cultivated here. At present the greatest Quantity of it is cultivated in Flanders and Holland, from whence we are annually furnish'd with it, in three different Manners, and distinguish'd by the Names of Madder in the Branch, Madder in the Bundle, and Madder unbundled: The first Sort is brought to us in the Root, as it comes out of the Ground, without any other Preparation than that of being dried. The second Sort is that of Bunch Madder, or such as is made into Bundles, which is Madder in Branch, first freed from the Bark and the Pith, then ground by a Mill into gross Powder, as we buy it. The third Sort is the Madder unbundled, that is, the Branched Madder ground into Powder; but the Bunched Madder, or that in Bundles is the best, which for its Excellency, when it is fresh, is made into Bales, or put up into Casks; 'tis of a pale Red, but as it grows older, increases its Colour to a fine Red; that of Zealand is esteem'd the best for the Dyers Use.

In the Year 1727. I observed a great Quantity of this Plant cultivated in Holland, between Helvoetsluyce and the Brill, and it being the first Time I had ever seen any considerable Parcel of it, I was tempted to make some Enquiries about its Culture, and take some Minutes of it down upon the Spot, which I shall here insert, for the Use of such as may have Curiosity to attempt the Culture of it.

In Autumn they plough the Land, where they intend to plant Madder in the Spring, and lay it in high Ridges, that the Frost may mellow it; in March they plough it again, and at this Season they work it very deep, laying

it up in Ridges eighteen Inches asunder, and about a Foot deep; then about the Beginning of *April*, when the *Madder* will begin to shoot out of the Ground, they open the Earth about their old Roots, and take off all the Side-shoots which extend themselves horizontally, just under the Surface of the Ground, preserving as much Root to them as possible: These they transplant immediately upon the Tops of the new Ridges, at about a Foot apart, observing always to do this when there are some Showers, because then the Plants will take Root in a few Days, and will require no Water.

When the Plants are growing, they carefully keep the Ground hoed, to prevent the Weeds from coming up between them, for if they are smothered by Weeds, especially when young, it will either destroy or weaken them so much, that they seldom do well after. In these Ridges they let the Plants remain two Seasons, during which Time they keep the Ground very clean, and at *Michaelmas*, when the Tops of the Plants are decay'd, they take up the Roots, and dry them for Sale. This is what I could learn of their Method of cultivating this Plant, to which I will subjoin a few Observations of my own, which I have since made upon the Culture of *Madder* in *England*. And, first, I find there is no Necessity for laying the Ground up in Ridges in *England*, as is practis'd by the *Dutch*, (especially in dry Land) because the Places where I saw it, were very wet Land, which is often floated in *Winter*; so that if the Plants were not elevated upon Ridges their Roots would rot in *Winter*. Secondly, They should be planted at a greater Distance in *England*, the Rows should be at least three Feet Distance, and the Plants eighteen Inches asunder in the Rows; for as they extend themselves pretty far underground, so where they are planted too near, their Roots will not have Room to grow. And, thirdly, I find, that if all the horizontal Roots are destroy'd from time to time, as they are produced, it will cause the large downright Roots to be much bigger, in which the Goodness of this Commodity chiefly consists: For if the upper Roots are suffered to remain, they will draw off the principal Nourishment from the downright Roots, as I have experienced; for I planted a few Roots upon the same Soil and Situation, which were of equal Strength, and rooted equally well, half of these I hoed round, and cut off the horizontal Roots, and the other half I permitted the horizontal Roots to remain on, and when I took them all up, those which I had hoed about and kept clear from horizontal Roots, were almost as large again as the other, and the Roots were double the Weight; which plainly proves it necessary to cut off those superficial Roots.

The Manner of drying and preparing these Roots for Use, I am not acquainted with, having never had an Opportunity of seeing that Part, so can give no Instructions concern-

ing it; but whoever shall have Curiosity enough to cultivate this useful Plant, might easily inform themselves, by going over to *Holland* at the Season of taking up the Roots.

The two Sorts of *Wild Madder* are of no Use; though their Roots seem to be of the same Quality with the manured Sort; and as they are never cultivated in Gardens, it is needless to say any thing more of them in this Place.

These Plants love a loose Soil, neither too dry nor over wet, but will do better in a dry than on a wet Soil, because in such Places the Roots are apt to rot in *Winter*.

RUBUS, [this Plant is so call'd of the red Colour of the Fruit before it comes to Maturity.] The Bramble or Rasp-berry-bush.

The Characters are;

It hath a Flower consisting of five Leaves, which are placed circularly, and do expand in form of a Rose; the Flower-cup is divided into five Parts, containing many Stamina, or Chives, in the Bosom of the Flower, in the Center of which rises the Pointal, which afterwards becomes the Fruit, consisting of many Protuberances, and full of Juice.

The Species are;

1. RUBUS; *major, fructu nigro*. J. B. The common Bramble or Blackberry-bush.

2. RUBUS; *minor, fructu caruleo*. J. B. The Dewberry-bush, or Lesser Bramble.

3. RUBUS; *vulgaris, major, fructu albo*. Raii Syn. The common Greater Bramble-bush with white Fruit.

4. RUBUS; *vulgaris, major, folio eleganter variegato*. The greater Bramble-bush with a beautiful strip'd Leaf.

5. RUBUS; *Idæus, spinosus, fructu rubro*. J. B. The Raspberry-bush, Framboise, or Hind-berry.

6. RUBUS; *Idæus, spinosus, fructu albo*. J. B. The Raspberry-bush with white Fruit.

7. RUBUS; *Idæus, spinosus, fructu rubro, serotino*. The Raspberry-bush with late red Fruit.

8. RUBUS; *Idæus, non spinosus*. J. B. The Raspberry-bush without Thorns.

9. RUBUS; *Idæus, fructu nigro, Virginianus*. Bauister. The Virginian Raspberry-bush with black Fruit.

10. RUBUS; *odoratus*. Cornut. Virginian flowering Raspberry, *vulgô*.

11. RUBUS; *Americanus, magis erectus, spinis rarioribus, stipite caruleo*. Pluk. Alm. The upright Pensilvania Bramble, or Raspberry-bush.

12. RUBUS; *Alpinus, humilis*. J. B. Dwarf Bramble of the Alps.

The first and second Sorts are very common in Hedges, and upon dry Banks in most Parts of *England*, and are rarely cultivated in Gardens. The third Sort was found by Mr. *Jacob Bobart* in a Hedge not far from *Oxford*, and hath since

since been cultivated in several Gardens as a Curiosity. This does not only differ from the common *Bramble* in the Colour of the Fruit, but also in the Colour of the Bark and the Leaves, which in this Sort are of a lively Green; whereas those of the common Sort are of a dark brown Colour. The fourth Sort is a Variety of the common *Bramble*, differing therefrom only in having strip'd Leaves, for which it is preserv'd by some Persons who are curious in collecting variegated Plants.

The *Raspberry-Bush* is also very common in divers Woods in the Northern Counties of England, but is cultivated in all curious Gardens for the Sake of its Fruit. Of this there are three Kinds, which are cultivated commonly in the Gardens near London; which are the common Red, late Red, and the White Sorts; but the Sort without Thorns is less common at present than the other.

The ninth, tenth, eleventh and twelfth Sorts are preserv'd as Curiosities in several Gardens near London; but as their Fruits are of no Value, so they are scarcely worth cultivating, except in Botanick Gardens for Variety.

All these Plants are easily propagated by Suckers, which they send from the Roots in great Plenty. The best Time to take them off, and transplant them, is in *October*, that they may take good Root before *Winter*, which will cause them to be strong, and produce Fruit the succeeding *Summer*.

In preparing these Plants, their Fibres should be shorten'd; but the Buds which are plac'd at a small Distance from the Stem of the Plant, must not be cut off, because those produce the new Shoots the following *Summer*. These Plants should be planted about two Feet asunder in the Rows, and four or five Feet Distance Row from Row; for if they are planted too close, their Fruit is never so fair, nor will ripen so kindly as when they have Room for the Air to pass between the Rows. The Soil in which they thrive best, is a fresh, sandy Loam, neither too moist nor over dry, the Extreme of either being injurious to these Plants.

The Time for dressing of them is in *October*, when all the old Wood, which produc'd Fruit the preceding *Summer*, should be cut out down to the Surface of the Ground, and the young Shoots must be shorten'd to about two Feet in Length; then the Spaces between the Rows should be well dug to encourage their Roots; and if you bury a very little rotten Dung therein, it will make them shoot vigorously the *Summer* following, and their Fruit will be much fairer. During the *Summer* Season they should be kept clear from Weeds, which, with the before-mention'd Culture, is all the Management they will require: But it is proper to make new Plantations once in three or four Years, because those are better than such Plants as are suffer'd to remain longer.

All the other Sorts are propagated from Suckers in the same Manner as the Garden *Raspberries*, and are equally hardy, so that they may be placed in the open Air in any

Part of the Garden, provided it be not over moist, which is apt to rot the Roots of some Sorts in *Winter*, but especially of the *Canada* Sort, which is apt to perish if planted in a very wet Soil.

RUSCUS; [so call'd of *Rusticus*, q. d. a rustick Plant, because the Countrymen in old Time used to lay it upon their Flesh to defend it from Mice. It is also called *Laurus*, because it is fit for making Laurel Garlands. It is also called *Alexandrina*, from its growing in *Alexandria*.] Knee-Holly or Butchers-Broom.

The Characters are;

The Flower-cup consists of one Leaf, which is cut into several Divisions, out of which is produced a globular Bell-shap'd Flower, consisting also of one Leaf, in the Center of which rises the Pointal, which afterwards becomes a soft roundish Fruit, in which is inclos'd one or two hard Seeds.

The Species are;

1. *Ruscus*; *myrtifolius*, *aculeatus*. *Tourn.* The common Knee-Holly or Butchers-Broom.

2. *Ruscus*; *angustifolius fructu folio innascente*. *Tourn.* Narrow-leav'd Butchers-Broom or Alexandrian Laurel, with the Fruit growing on the Leaves.

3. *Ruscus*; *latifolius*, *fructu folio, innascente*. *Tourn.* Broad-leav'd Butchers-Broom or Alexandrian Laurel, with the Fruit growing on the Leaves.

4. *Ruscus*; *angustifolius, fructu summis ramulis innascente*. *Tourn.* Narrow-leav'd Butchers-Broom or Alexandrian Laurel, with the Fruit growing upon the Tops of the Branches.

5. *Ruscus*; *latifolius, crenatis, fructu & crenis foliorum prodeuntibus*. Broad-leav'd Alexandrian Laurel, with the Fruit growing upon the Edges of the Leaves.

The first Sort is very common in the Woods in divers Parts of England, and is rarely cultivated in Gardens. The Roots of this Kind are sometimes used in Medicine, and the green Shoots are cut, and bound into Bundles, and sold to the Butchers, who use it as Besoms to sweep their Blocks; from whence it had the Name of *Butchers-Broom*.

The second, third, and fourth Sorts are hardy Plants, and tho' not Natives of England, yet may be preserv'd in Gardens, if planted in a shady Situation, as in Wilderness-Quarters, &c. where they serve to intermix with other Wood Plants to make Variety; and the third Sort is sometimes used in Medicine. These Plants may be propagated by parting their Roots in the *Spring* of the Year, before they begin to make new Shoots, observing, if the Season be dry, to water them until they have taken Root; after which they will require no farther Care but to keep them clear from Weeds, observing not to transplant or disturb their Roots oftner than once in three or four Years, for when they are often removed, they seldom thrive well, and do rarely produce Fruit.

The fifth Sort is tender, and must therefore be plac'd in Pots fill'd with fresh Earth, and in

Winter

Winter put into the Green-house ; but it should be plac'd where it may have free Air in mild Weather, and be constantly water'd : In which Management, this Plant will send forth Stems six or eight Feet high, furnish'd with Leaves from bottom to top, which in *June* will be closely set with Flowers upon their Edges, which do make a very beautiful and odd Appearance, and renders it worthy of a Place in every good Collection of Plants. This is also propagated by parting the Roots, as the former, which should not be done very often, because if the Roots are not permitted to remain some time to get Strength, they will produce but weak Shoots, and very few Flowers ; and in the Strength of their Shoots, and Number of Flowers the greatest Beauty of these Plants consists.

It is generally suppos'd, that it was one of these Plants which the antient Victors were crown'd with ; and since from the Pliableness of their Branches, whereby they are very proper to wreath into any Figure, as also from the Resemblance those Coronets, which we see surrounding the Heads of some antient Busts, have to the Leaves of these Plants ; so that it is a probable Conjecture at least.

RUTA ; [This Plant is call'd *Ruta*, of *ῥῦα*, to preserve, because it is a Plant very good to preserve Health.] Rue.

The Characters are ;

The Flower for the most Part consists of four hollow Leaves, which are plac'd orbicularly, and do expand in form of a Rose ; out of whose Flower-cup rises the Pointal, which afterwards becomes a roundish Fruit, which is generally four-corner'd, and compos'd of four Cells fix'd to an Axis, and full of small angular Seeds.

The Species are ;

1. RUTA ; *major, bortenfis, latifolia*. Mor. Hist. The common broad-leav'd Garden Rue.

2. RUTA ; *bortenfis, minor, tenuifolia*. Mor. Hist. The lesser Garden Rue, with narrow Leaves.

3. RUTA ; *bortenfis, minor, tenuifolia, foliis variegatis argenteis*. Boerb. Ind. The lesser Garden Rue, with narrow Leaves, variegated with White.

4. RUTA ; *Chalepensis, latifolia, florum petalis villis scatentibus*. H. L. The broad-leav'd Aleppo Rue, whose Flower-leaves are beset with Down.

5. RUTA ; *Chalepensis, tenuifolia, florum petalis, villis scatentibus*. Mor. Hist. Narrow-leav'd Aleppo Rue, whose Flower-leaves are beset with Down.

6. RUTA ; *sylvestris, major*. C. B. P. Greater Wild Rue.

There are some other Varieties of these Plants which are preserv'd in curious Botanick Gardens, but those here mention'd are all the Sorts which I have seen cultivated in the English Gardens.

The first Sort here mention'd, is that which the College of Physicians have directed to be used in Medicine, and is the most commonly cultivated in England.

The second Sort is propagated but in few Gardens in England ; tho' the third, which is a Variety of the second, and only differing from it in having its Leaves variegated with White, is very common in England, being greatly cultivated by those Gardeners who supply the London Markets with Plants in the Spring Season, at which Time this Plant makes a beautiful Appearance ; but as the Season advances, and the Plants increase in Vigour, so the Variegation of the Leaves goes off, and they appear almost green, but their Colour returns again in *Winter*.

The two Sorts of *Aleppo Rue* are only preserv'd in some curious Gardens, being rarely used in Medicine ; though, of late Years, the broad-leav'd Sort was become so plenty, as to be brought to the Markets instead of the first Sort : But it being much ranker, and of a more offensive Smell, it was neglected.

The greater Wild Rue is less common in England than either of the former. This I rais'd from Seeds, which were sent me by my Honoured Friend Mr. Henry Hopkey, from Gibraltar, where this Plant grows upon the Hills in great Plenty.

All these Plants may be propagated either by sowing of their Seeds, or by planting Slips or Cuttings, both of which must be done in the Spring. The Manner of propagating them from Cuttings being the same with *Rosemary*, &c. I shall not repeat it here, but refer the Reader to that Article ; and if they are propagated by Seeds, there needs no farther Care but to dig a Bed of fresh Earth in the Spring, making it level ; then to sow the Seeds thereon, treading them in, and raking the Ground smooth : After which you must observe to keep the Bed clear from Weeds until the Plants are come up about two Inches high ; when they should be transplanted out into fresh Beds, where they may remain for Use. All these Plants must have a dry Soil, otherwise they are very subject to be destroy'd in *Winter*. The two *Aleppo Rues*, and the Wild Rue are somewhat tenderer than the common Sort ; but these will endure our ordinary *Winters* very well in the open Air, especially if they are planted on a dry Soil.

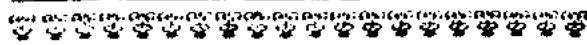
These Plants were formerly used to plant for Edgings on the Sides of Borders ; but they are by no means proper for this Use, for they shoot so vigorously that there is no keeping them within the Bounds of an Edging ; besides, when they are kept closely shear'd they appear very ragged and stumpy, and their Roots do spread so far, as to exhaust the Goodness of the Soil, so that the other Plants would be depriv'd of their Nourishment ; which Reasons have caus'd them to be wholly neglected for this Purpose ; so that, at present, they are chiefly cultivated for Medicinal Use, or to furnish the Balconies of the Citizens in the Spring.

RUTA CANINA ; vide *Scrophularia*.

RUTA MURARIA ; Wall-Rue or White Maidenhair.

This

This Plant is found growing out of the Joints of old Walls in divers Parts of England, where it is gathered for Medicinal Use ; but as it can't be cultivated in Gardens, so as to grow to Advantage, I shall not say any thing more of it in this Place.



S A

SABINA; The Savine-Tree.

The Characters are ;

It hath compact, rigid, and prickly Ever-green Leaves ; the Fruit is small, spherical, and warted, and the whole Plant has a very rank, strong Smell.

The Species are ;

1. SABINA ; folio Tamarisci, Dioscoridis. C. B. P. The Male or common Savin.

2. SABINA ; folio Cypressi. C. B. P. The Berry-bearing or Upright Savin.

3. SABINA ; folio variegato. The strip'd Savin.

These Plants are commonly cultivated for Medicinal Use ; and are rarely planted in Gardens for Pleasure, because their ill Scent renders them disagreeable in frequented Places ; but yet they may be admitted for planting in Clumps, or to form Amphitheatres of Ever-green Trees ; where if these are intermix'd amongst other low-growing Plants, they will add to the Variety.

These Plants may be propagated by laying down their young Branches in the Spring ; which if duly water'd in dry Weather, will take Root in a Year's time, and may then be transplanted out either into a Nursery, or the Places where they are to remain : They may also be propagated by Cuttings, which should be planted on a moist Soil, about the Beginning of April, which, if duly water'd, will take Root ; and the Spring following may be remov'd, as was directed for the Layers.

The Time for transplanting these Plants is the same with most other Ever-green Trees, (viz.) in April ; observing to do it in cloudy Weather, laying a little Mulch upon the Surface of the Ground about their Roots to prevent their drying : After they are rooted, they will require no farther Care but to keep them clear from Weeds, and to dig the Ground about their Roots every Spring, which will greatly promote their Growth.

SAFFRON ; vide Crocus.

SAGE ; vide Salvia.

SALICARIA ; [takes its Name of *Salix*, a Sallow or Willow, because it grows on the Banks of Ditches under Willows. The Antients call'd it *Lyfimachia*. It is also call'd *Hysopifolia*, because its Leaves do something resemble those of the Hyssop.] Willow-wort or spiked Lofe-strife.

The Characters are ;

The Flowers consist of several Leaves, which are plac'd circularly, and do expand in form of a Rose ; these Leaves are produc'd from the Lucifers of the Flower-cup ; from the Center of the Flower-cup rises the Pointal, which afterwards becomes a Fruit or oval Husk, consisting of two Cells, and generally full of small Seeds, which adhere to the Placenta, and are commonly wrapped up in the Flower-cup.

The Species are ;

1. SALICARIA ; vulgaris, purpurea, foliis oblongis. Tourn. Purple-spiked Willow-herb or Lofe-strife, with long Leaves.

2. SALICARIA ; purpurea, foliis subrotundis. Tourn. Purple-spiked Willow-herb or Lofe-strife, with roundish Leaves.

These Plants are very common by the Sides of Ditches and other moist Places in divers Parts of England, and are rarely cultivated in Gardens ; yet for the Beauty of their long Spikes of purple Flowers, they deserve a Place in a good Garden, as also for their long Continuance in Flower : However, if there happens to be a moist boggy Place in a Garden where few other Plants will thrive, these may be plac'd there to Advantage, and will afford a great deal of Pleasure. They propagate themselves very fast by their creeping Roots, so that if they delight in the Soil, they will, in a short time, multiply exceedingly. These produce their Flowers in June and July, and do often continue till August in Beauty.

SALIX ; [takes its Name of *Salio*, to leap or dance, because of its quick Growth.] The Sallow or Willow-Tree.

The Characters are ;

It hath amentaceous Flowers, consisting of several Stamina, which are collected into a Spike, but are barren ; the Embryo's are produc'd upon different Trees from the Male Flowers, and do afterwards become a Fruit or Husk, shap'd like a Cone, opening in two Parts, and containing downy Seeds.

The Species are ;

1. SALIX ; vulgaris, alba, arborescens. C. B. P. The common White Willow.

2. SALIX ; folio laureo, seu lato glabro odorato. Phyt. Brit. The Bay-leav'd sweet Willow.

3. SALIX ; folio longo, utrinque virente odorato. The long-leav'd Sweet Willow.

4. SALIX ; folio longo, latoque, splendente, fragilis. Raii Syn. The Crack Willow.

5. SALIX ; folio Amygdalino, utrinque aurito, corticem abjiciens. Raii Syn. The Almond-leav'd Willow, that casts its Bark.

6. SALIX ; folio auriculato, splendente, flexilis. Cat. Cant. The round-ear'd shining Willow.

7. SALIX ; folio longo, subluteo, non auriculato, viminibus luteis. Raii Syn. The long-leav'd yellowish Willow.

8. SALIX ; latifolia, rotunda. C. B. P. Round-leav'd Sallow.

9. SALIX ; latifolia, rotunda, variegata. The strip'd Sallow.

10. SALIX; *latifolia, folia splendens*. Raii Syn. Broad shining-leav'd Willow.

11. SALIX; *orientalis, flagellis decursum, pubescentibus*. T. Cor. The Weeping Willow.

There are a greater Number of Species to be found in England than are here mentioned, especially of the *Sallows*, as I have been inform'd by a very judicious Basket-maker: There are at least thirty Sorts, which they distinguish by Name, commonly in use in their Trade; and besides these, there are a great Number of Mountain *Willows* which grow upon dry Grounds; but as these are seldom cultivated, so it would be to little Purpose to enumerate them in this Place.

All the Sorts of *Willows* may be easily propagated by planting Cuttings or Sets in the Spring, which do readily take Root, and are of quick Growth. Those Sorts which grow to be large Trees, and are cultivated for their Timber, are generally planted from Sets, which are about seven Feet long: These are sharpen'd at their larger End, and thrust into the Ground by the Sides of Ditches and Banks where the Ground is moist; in which Places they make a considerable Progress, and are a great Improvement to such Estates, because their Tops will be fit to lop every third or fourth Year. The larger Wood, if found, is commonly sold for making Wooden Heels, or Soles for Shoes, as also to the Turners for many Kinds of light Ware.

The *Sallows* are commonly planted in Cuttings, made from strong Shoots of the former Year, and are about three Feet long: These are commonly thrust down two Feet deep into the Ground, and are one Foot above it. The Soil should always be dug or plough'd before they are planted, and the Cuttings plac'd about three Feet Row from Row, and eighteen Inches asunder in the Rows, observing always to place the Rows the sloping Way of the Ground, (especially if the Tides overflow the Place) because if the Rows are plac'd the contrary Ways, all the Weeds and Filth will be detain'd by the Plants, which will choak 'em up. The best Season for planting these Cuttings is in February, for if they are planted sooner, they are apt to peel, if it proves hard Frost, which greatly injures them. These Plants are always cut every Year, and if the Soil be good they will produce a great Crop; so that the yearly Produce of one Acre has been often sold for fifteen Pounds, but ten Pounds is a common Price, which is much better than Corn-Land: so that it is great Pity these Plants are not more cultivated, especially upon moist boggy Soils, upon which few other Things will thrive.

SALT is a fossil Body, fusible by Fire, and congealable again, in the Cold, into brittle Glebes or Crystals; soluble withal in Water, so as to disappear therein, never malleable, and having something in it, which to the Organ of Taste, affords a Sensation of Acrimony and Sharpness.

Dr. Grew supposes, That the chief governing Principle in the Juices of Plants, is, the

Saline or Salt; which saline Principle is to be understood as a general Term. The vegetable Salts seem to be four, viz. the Nitrous, the Acid, the Alkaline, and the Marine.

The nitrous Salts seem by Nature to be assign'd chiefly to the Growth of Plants; and the other three Salts are exhibited by the several Ways of resolving the Principles of a Plant.

Salt is accounted good for cold Lands, because the Nature of it is such, that the drier and hotter it is kept, the more it keeps its own Body, and does not turn to Water; and when it stands in a cold, moist Place, then, in a little time, it dissolves to Water; and when it is turn'd to Water, then it is fit for the Nourishment and Feeding of Seeds, especially Annuals.

The Reason why Salt, viz. Salt-water, is accounted a Feeder of Seeds or Plants, is, that it has been often observ'd, that Salt falling on a Board, &c. will be long a drying; and if it has been dry'd by Heat, Dews or Rain, will make it moist again, and then it steams forth, and that is it which nourishes all Plants: But if it be upon a hot and dry Ground, late in the Spring, and dry Weather comes, then it does not, nor cannot, yield its Steam or Fume.

Pigeons Dung is by many esteem'd good for cold Lands, because it is hotter and saltier than any other Dung, it being natural to Pigeons to eat Salt; for they fly to the Sea-side early on Mornings to pick up that Salt which the Heat of the Sun makes by drying up the Salt-water, and leaves upon the Sand.

The Reverend Mr. Hales, in his excellent Treatise of Vegetation, observes, That Plants of a less durable Texture, as they abound with a greater Proportion of Salt and Water, which is not so strongly attracting as Sulphur and Air, so they are the less able to endure the Cold: And as Plants are observ'd to have a greater Proportion of Salt and Water in them in the Spring than in Autumn, so they are more easily injur'd by Cold in the Spring than in a more advanc'd Age, when their Quantity of Oil is increas'd, with their greater Maturity.

Hence we find, that Nature's chief Business in bringing the Parts of a Vegetable, especially its Fruit and Seed, to a Maturity, is to combine together, in a due Proportion, the more active and noble Principles of Sulphur and Air that chiefly constitute Oil, which in its most refin'd State is never found without some Degree of Earth and Salt in it.

SALVIA; [so call'd of *Salvus*, or *Salus Vitæ*, i. e. the Health of Life.] Sage.

The Characters are;

It hath a labiated Flower, consisting of one Leaf, whose Upper-lip is sometimes arch'd, and sometimes hooked; but the Under-lip (or Beard) is divided into three Parts, bunching out, and not hollow'd as the Clary; out of the Flower-cup rises the Pointal, attended, as it were, by four Embryo's, which afterwards become so many Seeds, which are roundish, shut up in a Husk, which

was

was before the Flower-cup : To which may be added, That the Stamina do somewhat resemble the Os Hyoidis.

The Species are ;

1. SALVIA ; *major*, an *Sphacelus Theophrasti*. C. B. P. The greater or common Sage.

2. SALVIA ; *nigra*. C. B. P. Common Red Sage.

3. SALVIA ; *major*, *foliis ex viridi & albo variegatis*. Boerb. Ind. The greater Sage, with Leaves variegated with White and Green.

4. SALVIA ; *foliis versicoloribus*. C. B. P. Party-colour'd Sage.

5. SALVIA ; *latifolia, serrata*. C. B. P. Broad-leav'd notch'd Sage.

6. SALVIA ; *latifolia, serrata, foliis ex albo variegatis*. Broad-leav'd Sage, with variegated Leaves.

7. SALVIA ; *absinthium, redolens*. J. B. Wormwood Sage.

8. SALVIA ; *minor, aurita, & non aurita*. C. B. P. Sage of Virtue.

9. SALVIA ; *minor, foliis variegatis*. H. R. Par. Sage of Virtue, with strip'd Leaves.

10. SALVIA ; *Orientalis, latifolia, absinthium redolens, flore carneo magno*. Boerb. Ind. Broad-leav'd Eastern Sage, smelling like Wormwood, with a large Flesh-colour'd Flower.

11. SALVIA ; *Orientalis latifolia, bristuliflora, viscosa, pinnata, flore & calice purpureis, modera*. Boerb. Ind. Eastern Sage, with broad, hairy, chimney-winged Leaves, with a purple Flower and Flower-cup, without Smell.

12. SALVIA ; *Africana, frutescens, folio scorodoniae, flore violaceo*. H. A. Shrubby African Sage, with a Wood Sage Leaf and a Violet-colour'd Flower.

13. SALVIA ; *Africana, frutescens, folio subrotundo, glauco, flore aureo magno*. H. A. Shrubby African Sage, with roundish Sea-green Leaves, and a large Golden-Flower.

14. SALVIA ; *Orientalis, absinthium redolens, foliis pinnatis, flore carneo elatior*. Sher. Eastern Upright Wormwood-Sage, with winged Leaves and a Flesh colour'd Flower.

15. SALVIA ; *Hispanica, folio lavendulae*. Tourne. Spanish Sage, with a Lavender-leaf.

There are several other Species of this Plant which are preserv'd in some curious Botanick Gardens abroad ; but those here mention'd are what I have observ'd in the English Gardens.

The first Sort, tho' the most common in many Parts of Europe, yet is but rarely to be seen in the English Gardens ; but the red Sort is most commonly cultivated in this Country, which many Persons suppose to be only a Variety of the common Sort ; but it constantly preserves its Difference when rais'd from Seeds, as I have two or three times experimented ; so that I don't scruple to make it a distinct Species, since its Difference from the common is much greater than in some of the other Sorts of Sage, particularly the Sage of Virtue, and the Lavender-leav'd Sage ; both which, when cultivated in a good Soil, are so nearly alike, as not to be distinguish'd by the best Botanists. This Red Sage, the Wormwood Sage, and Sage of Virtue, are the principal Sorts which are culti-

vated for Use in England ; tho' the broad-leav'd Sage is much preferable to the Sage of Virtue for Tea, it giving the Water a much more grateful Flavour, and is esteem'd to be of a less drying Quality ; so that most Persons who are Lovers of Sage-Tea, do prefer this for that Purpose.

All the Sorts of Sage (except the eleventh Sort, which is but annual) may be propagated by planting Cuttings or Slips, during any of the Summer Months, observing to water and shade them until they have taken Root ; after which they may be taken up, and planted where they are design'd to remain, which should always be upon a dry Soil, and where they may have the Benefit of the Sun ; for if they are planted on a moist Soil, or in a shady Situation, they are very subject to be destroy'd in Winter ; nor will these Plants endure the Cold so well when planted upon a rich Soil, as those which have a barren, dry, rocky Soil, which is the Case of most of the Verticillate Plants. The Side-shoots and Tops of these Plants may be gather'd in the Summer, and dry'd, if design'd for Tea, otherwise they are best taken green from the Plants for most other Uses.

The twelfth, thirteenth, and fourteenth Sorts are somewhat tender, therefore these must be planted into Pots fill'd with fresh, light, sandy Earth ; and in Winter must be remov'd into the Conservatory, where they should be plac'd as near the Windows as possible, that they may have a great Share of fresh Air whenever the Season is mild, for if they are too much drawn, they seldom flower well, and make but an indifferent Appearance : In Summer they must be expos'd amongst other Exotick Plants in some well-shelter'd Situation, for they are pretty hardy, and do only require to be shelter'd from Frost and strong Winds. These Plants must be often refresh'd with Water, (especially in warm Weather, otherwise they will shrivel and decay ; and they should be transplanted at least twice every Summer, because their Roots do greatly increase ; which if confin'd in the Pots too long, will turn mouldy, and decay. The other Oriental Sorts are hardy enough to endure the Cold of our ordinary Winters in the open Air, provided they are planted in a dry Soil, and a warm Situation.

These Plants may also be propagated by sowing their Seeds in the Spring upon a Bed of fresh Earth, observing to keep the Ground clear from Weeds until the Plants are come up ; when they should be transplanted into Beds of fresh Earth, and treated as those rais'd from Cuttings or Slips.

SALVIA AGRESTIS ; vide Scordium.

SAMBUCUS ; [so call'd of *Sambuca*, which was a musical Instrument made of this Wood, used by the Antients. Others derive the Name of one *Sandix*, who found out the Virtues of this Tree.] The Elder-Tree.

The Characters are ;

The Branches are full of Pith, having but little Wood ; the Flowers are monopetalous, divided

vided into several Segments, and expand in Form of a Rose; these are for the most Part collected into an Umbel, and are succeeded by soft succulent Berries, having three Seeds in each.

The Species are;

1. *SAMBUCUS*; *fructu in umbellâ nigro*. C. B. P. Common Elder, with black Berries.
2. *SAMBUCUS*; *fructu in umbellâ viridi*. C. B. P. Common Elder, with greenish Berries.
3. *SAMBUCUS*; *fructu albo*. Lob. The white-berried Elder.
4. *SAMBUCUS*; *racemosa, rubra*. C. B. P. The Mountain red-berried Elder.
5. *SAMBUCUS*; *laciniato folio*. C. B. P. The Cut or Parsley-leav'd Elder.
6. *SAMBUCUS*; *vulgaris, foliis ex luteo variegatis*. The blotch'd-leav'd Elder.
7. *SAMBUCUS*; *humilis, sive Ebulus*. C. B. P. Dwarf-Elder or Danewort.

The first of these Trees is very common in the Hedges in most Parts of England, but the second and third Sorts are more rare; these are propagated for the Sake of their Berries, which are by some Persons used for making Wine, and for other Purposes. The fourth Sort is less common in England than either of the former, it being only to be found in some curious Gardens at present. The fifth and sixth Sorts are preserved for the Variety of their Leaves, by such as are curious in collecting the various Kinds of Trees and Shrubs.

All these Sorts may be easily propagated from Cuttings, or by sowing their Seeds; but the former being the most expeditious Method, is generally practis'd. The Time for planting of their Cuttings is any time from September to March, in the doing of which there needs no more Care than to thrust the Cuttings about six or eight Inches into the Ground, and they will take Root fast enough; and may afterwards be transplanted where they are to remain; which may be upon almost any Soil or Situation; they are extream hardy, and if their Seeds are permitted to fall upon the Ground, they will produce a Plenty of Plants the succeeding Summer.

These Trees are often planted for making Fences, because of their quick Growth, but as their Bottoms become naked in a few Years, so they are not so proper for that Use; neither would I recommend them to be planted near Habitations, because at the Season when they are in Flower, they emit such a strong Scent, as will occasion violent Pains in the Heads of those who abide long near 'em; besides, the crude Parts which are continually perspired through their Leaves are accounted unwholesome, though the Leaves, Bark, and other Parts are greatly esteemed for many Uses in Medicine.

The Dwarf-Elder is found wild in some Counties of England, but near London it is propagated in Gardens for Medicinal Use; though very often the Herb-women in the Markets, do give the tender Shoots of the Elder-tree instead of this, to such Persons as can't distinguish them asunder.

This Plant multiplies exceeding fast by its creeping Root, which, if permitted to run, will soon overspread a large Spot of Ground; the Off-sets of these Roots may be transplanted any time from September to March, and will grow in any Soil or Situation, but should be allowed Room to spread, for if they are planted near other Plants, they will over-run and destroy them.

SAND, as Dr. Boerhaave defines it, is Earth properly so called, which is a fossil Body, neither dissoluble by Fire, Water, nor Air, insipid and untransparent; more fusible than Stone; still friable, and containing usually a Share of Fatness.

Dr. Lister divides the English Sands into two Classes; the first, *sharp or Rag-Sand*, consisting of small, transparent Pebbles, naturally found on the Mountains, and not calcinable: These he farther divides into *fine* and *coarse*, and subdivides each according to the Colours, into white, grey, reddish, brown, &c.

The second, *soft or smooth*, which he subdivides into that with flat Particles broke from Lime-stones, that with Silver-like Particles, and that with Gold-like Particles.

As to Sand, its Use is to make the clayey Earth fertile, and fit to feed Vegetables, &c. for Earth alone we find is liable to coalesce, and gather into a hard coherent Mass, as is apparent in Clay; and Earth thus imbodyed, and, as it were, glued together, is no way dispos'd to nourish Vegetables: But if with such Earth, Sand, &c. i. e. hard Crystals, (which are not dissolvable in Water, and still retain their Figure) be intermixed, they will keep the Pores of the Earth open, and the Earth itself loose and incompact, and by that means give Room for the Juices to ascend, and for Plants to be nourished thereby.

Thus a Vegetable planted either in Sand alone, or in a fat Glebe, or Earth alone, receives no Growth or Increment at all, but is either starved or suffocated; but mix the two, and the Mass becomes fertile. In effect, by means of Sand the Earth is render'd, in some manner, organical; Pores and Interstices being hereby maintained, something analogous to Vessels, by which the Juices may be convey'd, prepar'd, digested, circulated, and at length excern'd, and thrown off into the Roots of Plants.

Grounds that are sandy and gravelly do easily admit both of Heat and Moisture, but then they are liable to these Inconveniencies; That they let them pass too soon, and so contract no Ligature, or else retain it too long, especially where there is a Clay Bottom, and by that means it either parches or chills too much, and produces nothing but Moss and cancrus Infirmities; but if the Sand happens to have a Surface of good Mould, and a Bottom of Gravel or loose Stone, though it do not hold the Water, it may produce a forward sweet Grass; and though it may be subject to burn, yet it quickly recovers itself with the least Rain.

Sea-sand

Sea-sand is accounted a very good Compost for stiff Ground, for it effects the two Things following, viz. It makes Way for the Tree or Seed to root in stiff Ground, and makes a Fume to feed it.

Sand indeed is apt to push the Plants, that grow upon it, early in the *Spring*, and make them germinate near a Month sooner than those that grow upon Clay; because the Salts in the *Sand* are at full Liberty to be raised, and put into Motion upon the least Approach of the Warmth of the Sun; but then as they are hasty, they are soon exhal'd and lost.

SANGUIS DRACONIS; vide Palma.

SANICULA, [so call'd of *sanando*, *healing*, because it is good in many Distempers.] Sanicle.

The Characters are;

It is an umbelliferous Plant, whose Flower consists of five Leaves placed orbicularly, but are generally bent back to the Center of the Flower, resting on the Empalement, which becomes a Fruit compos'd of two Seeds, that are gibbous and prickly on one Side, but plain on the other; some of the Flowers are always barren.

There is but one Species of this Plant at present in England, viz.

SANICULA; officinarum. C. B. P. Sanicle or Self-heal.

This Plant is found wild in Woods and shady Places in most Parts of England, but being a Medicinal Plant may be propagated in Gardens for Use: It may be increased by parting of the Roots, any time from September to March, but it is best to do it in Autumn, that the Plants may be well rooted before the dry Weather in Spring comes on: They should have a moist Soil and a shady Situation, in which they will thrive exceedingly.

SANTOLINA, [so call'd on account of its great Virtue, q. *Sancta Herba*, i. e. the Holy Herb.] Lavender Cotton.

The Characters are;

It hath a globose flosculous Flower, consisting of many Florets, divided into several Segments, sitting on the Embryo, contained in the intermediate little Leaves, hollowed like a Gutter, and a squamous hemispherical Empalement; the Embryo afterwards becomes a Seed, not at all furnish'd with Down. To these Notes must be added, larger Flowers than those of *Hormwood* and *Southernwood*, and also the whole Face of the Plant.

The Species are;

1. SANTOLINA; foliis teretibus. Tourn. Common Lavender Cotton.

2. SANTOLINA; flore majore, foliis villosis & incanis. Tourn. Lavender Cotton with a larger Flower and hoary Leaves.

3. SANTOLINA; foliis Ericæ vel Sabinæ. Tourn. Green-leav'd Lavender Cotton with a Scent like Ointment.

4. SANTOLINA; foliis Cypressi. Tourn. Cypress-leav'd Lavender Cotton.

5. SANTOLINA; repens & canescens. Tourn. Creeping and hoary Lavender Cotton.

6. SANTOLINA; foliis minus incanis. Tourn. Lavender Cotton with less hoary Leaves.

7. SANTOLINA; foliis obscure virentibus, flore aureo Tourn. Lavender Cotton with dark-green Leaves and a golden Flower.

8. SANTOLINA; foliis Rosifmarini major. Tourn. Greater Lavender Cotton with Rosemary Leaves.

9. SANTOLINA; vermiculata, Cretica. Tourn. Vermiculated Lavender Cotton of Candy.

The first of these Plants is cultivated in Gardens for Medicinal Use; as is the third, for furnishing Balconies, and other little Places in and near the City, by way of Ornament; but the other Sorts are rarely to be found, but in the Gardens of those who are curious in Botanical Studies.

Most of these Plants may be cultivated so as to become Ornaments to a Garden, particularly in small Bosquets of ever-green Shrubs, where, if these are artfully intermix'd with other Plants of the same Growth, and placed in the front Line, they will make an agreeable Variety; especially if Care be taken to trim them twice in a Summer, to keep them within Bounds; otherwise their Branches are apt to straggle, and in wet Weather to be born down and displaced, which renders them unsightly; but when they are kept in Order, their hoary and different coloured Leaves will have a pretty Effect in such Plantations.

These Plants may be propagated by planting Slips or Cuttings of any of the Kinds, during the Spring, which should be put into a Border of light fresh Earth, and watered and shaded in hot dry Weather, until they have taken Root; after which they will require no farther Care, but to keep them clear from Weeds, 'till August, when they should be carefully taken up and transplanted where they are design'd to remain: But if the Ground is not ready by that Time to receive 'em, it will be proper to let them remain in the Border until Spring; for if they are transplanted late in Autumn, they are liable to be destroy'd by a little Cold in Winter.

These Plants are very hardy, and if planted in a lean, gravelly, or sandy dry Soil, will continue many Years, and resist the Cold very well; but if they are in a wet or rich Soil, they are often destroy'd in Winter.

SAP: The Notion of the Sap's Circulation was entertained by several Authors much about the same Time, without any Communication from one to another; particularly M. Major, a Physician of Hambourg, M. Perrault, Mariotte, and Malpighi. It has met, however, with some considerable Opposers, particularly the excellent M. Dodart, who could never be reconciled to it.

One of the great Arguments for it is, That the same Experiments of Ligature and Incision which evince a Circulation of the Blood in Animals, succeed in the like Manner in Plants, particularly

ticularly in such as abound with *Sap*, as the *Great Titbemale*, *Milk-thistle*, &c. if the Ligature be fastened tight round the Stem, the Part above it is found to swell very considerably, and that below it a little, whence it appears, that there is a Juice ascending from the Root, and likewise another descending from the Branches; and that the latter is thicker than the former, which quadrates exactly with the common System; the Juice being suppos'd to arise in capillary Vessels, in form of a subtil Vapour, which condensed in the Extrems of the Plant by the Neighbourhood of the cold Air, turns back in form of a Liquor, through the more patent Pipes of the inner Bark.

M. *Dodart*, instead of the same Juices going and returning, contends for two several Juices; the one imbibed from the Soil, digested in the Root, and from thence transmitted to the Extrems of the Branches, for the nourishing of the Plant; the other received from the Moisture of the Air, entering in at the Extremities of the Branches; so that the ascending and descending Juices are not the same.

One of his chief Arguments is, That if two Trees of the same Kind be transplanted in one Day, after first cutting off their Roots and Branches, and if after they have taken Root again, some of the new Shoots put forth each Year be cut off one of them, it will not thrive half so well, notwithstanding its Root and Trunk being entire, as the other.

This he conceives to be a Proof of the Plant's deriving Nourishment by the Branches, and concludes it to be of an aerial Nature, because form'd of the Moisture of the Air, Dew, &c. whereas that imbib'd from the Soil is terrestrial, &c. *Hist. de l'Acad. Roy. Ann.* 1709.

The Humour or *Sap* of a Plant, then, is a Juice, furnish'd by the Earth, and changed into the Plant, consisting of some fossil Parts, other Parts derived from the Air and Rain, and others from putrefied Animals, Plants, &c. consequently in Vegetables are contain'd all Kinds of Salts, Oil, Water, Earth, &c. and, probably, all Kinds of Metals too, inasmuch as the Ashes of Vegetables always yield somewhat which the Loadstone attracts.

This Juice enters the Plant in form of a fine and subtil Water; which the nearer it is to the Root, the more it retains of its proper Nature; and the farther from the Root the more Action it has sustain'd, and the nearer it approaches to the Nature of the Vegetable.

Consequently, when the Juice enters the Root, the Bark whereof is furnished with excretory Vessels, fitted to discharge the excrementitious Part, it is earthy, watry, poor, acid, and scarce oleaginous at all.

In the Trunk and Branches it is further prepared, though it still continues acid; as we see by tapping or perforating of a Tree in the Month of *February*, when it distils a watry Juice apparently acid.

The Juice being here carried to the Germs or Buds, is more concocted; and here having

unfolded the Leaves, these come to serve as Lungs for the Circulation, and further Preparation of the Juice.

For these tender Leaves being expos'd to the alternate Action of Heat and Cold, moist Nights, and hot scorching Days, are alternately expanded and contracted, and the more on Account of their reticular Texture.

By such Means is the Juice still further altered and digested, as it is further in the *Petala* or Leaves of the Flowers, which transmit the Juice, now brought to a further Subtlety, to the *Stamina*: These communicate it to the *Farina*, or Dust in the *Apices*, which is, as it were, the Male Seed of the Plant, where having undergone a further Maturation, it is shed into the *Pistil*, which performs the Office of an *Uterus* or Womb, and thus having acquir'd its last Perfection, it gives Rise to a new Fruit or Plant.

The Root or Part whereby Vegetables are connected to their *Matrix*, and by which they receive their nutritious Juice, consists of an infinite Number of *Vasa absorbentia*, which being dispers'd through the Interstices of the Earth, attract or imbibe the Juices of the same; consequently, every Thing in the Earth that is dissoluble in Water, is liable to be imbib'd; as Air, Salt, Oil, Fumes of Minerals, Metal, &c. and of these do Plants really consist.

These Juices are drawn from the Earth very crude, but by the Structure and Fabrick of the Plant, and the various Vessels they are strained through, become changed, further elaborated, secreted, and assimilated to the Substance of the Plant.

The Motion of the nutritious Juices of Vegetables is produc'd much like that of the Blood in Animals, by the Action of the Air; in effect, there is something equivalent to Respiration throughout the whole Plant.

The Discovery of this is owing to the admirable *Malpighi*, who first observ'd, that Vegetables consist of two Series, or Orders of Vessels.

1. Such as receive and convey the alimental Juices, answering to the Arteries, Lacteals, Veins, &c. of Animals.

2. *Tracheæ* or Air-Vessels, which are long hollow Pipes, wherein Air is continually receiv'd and expell'd, *i. e.* inspired and expired; within which *Tracheæ*, he shews all the former Series of Vessels are contained.

Hence it follows, that the Heat of a Year, nay, of a Day, of a single Hour or Minute, must have an Effect on the Air included in these *Tracheæ*, *i. e.* must rarefy it, and consequently dilate the *Tracheæ*, whence arises a perpetual Spring or Source of Action, to promote the Circulation in Plants.

For by the Expansion of the *Tracheæ*, the Vessels containing the Juices are pressed, and by that Means the Juice contained is continually propell'd, and so accelerated; by which Propulsion the Juice is continually comminuted, and render'd more and more subtil, and so enabled to enter Vessels still finer and finer, the thickest Part of it being at the same Time

Time secreted and deposited into the lateral Cells or *Loculi* of the Bark, to defend the Plant from Cold, and other external Injuries.

The Juice having thus gone its Stage, from the Root to the remote Branches, and even the Flower; and having in every Part of its Progress deposited something both for Aliment and Defence, what is redundant passes out into the Bark, the Vessels whereof are inoculated with those wherein the *Sap* mounted, and through these it re-descends to the Root, and thence to the Earth again; and thus a Circulation is effected.

Thus is every Vegetable acted on by Heat and Cold, during the Day-time especially, while the Sun's Force is considerable, the *Sap* Vessels squeez'd and press'd, and the *Sap* protruded and rais'd, and at length evacuated, and the Vessels exhausted; and in the Night again, the same *Tracheæ* being contracted by the Cold of the Air, the other Vessels are eas'd and relax'd, and so dispos'd to receive fresh Food for the next Day's Digestion and Excretion.

What Course the Juice takes after it is imbibed by the Roots, is not very clear, the Vessels that take it up to convey it to the Plant are too fine to be traced; and hence it has been controverted, whether it is by the Bark or the Pith, or the woody Part, that the Plant is fed.

The more common Opinion is for the Bark; the Juice rais'd by the Capillaries of the Wood is here supposed to descend by the larger Fibres, placed in the inmost Part thereof, immediately over the Wood; in which Descent the *Sap*, now sufficiently prepared, adds a Part of its Substance to the contiguous Wood, and thus increases by *Apposition*. And hence it may be, that hollow, carious, or rotten Trees, which have neither Pith nor Wood, except just enough to sustain the Bark, do grow and bear.

Some contend for the Wood, which they observe to consist of slender, capillary Tubes running parallel to each other from the Root up the Trunk, being proper to receive in a fine Vapour; in the Ascent whereof the Fibres become opened, and their Substance increased: And thus the Trunks of Trees are said to increase in their Circumference.

As for the Pith, as the woody Substance of the Trunk becomes more woody, the Pith is compress'd and straightened to such a Degree, that in some Trees it quite disappears; whence it seems, that its Office in Vegetation is not very important, since its Use is not perpetual. By its spongy Substance, it should seem fitted to receive any superfluous Moisture transuding through the Pores of the woody Fibres: And if by the Excess of such Moisture, or the like Cause, it corrupt and rot, as it frequently happens in Elms, the Tree does not grow the worse for it, which is a convincing Proof it is of no great Use.

The Learned Dr. *Boerhaave* distributes the Juices of Plants into six Classes:

1. The first Class comprehends the crude, *nutritious Juice*, or the Juices of the Root and Stem of Plants, which are little more than the mere Matter of the Element, as drawn by the Root from the Body it adheres to; whether it be Earth, Water, or the like.

This Juice is found in every Part of the Plant, and therefore may be held an *universal Juice*; yet he considers it as the Juice of the Root and Stem, because it is chiefly found in them.

This he takes to be a subacid watery *Lymph*, without any specific Taste or Smell, as not being yet arriv'd to the Maturity of Oiliness.

To this Class belong those Juices which distil in great abundance from Wounds or Incisions made in the woody Parts of Plants; such, *e. g.* is that tart Liquor oozing from the Root of the *Walnut-tree*, when cut off in the Month of *May*.

Such also is that limpid, subacid Humour, flowing out very plentifully at an Incision in the *Birch-tree* in the Month of *March*, to the Quantity of several Gallons in a few Days.

Such also is the Juice issuing out of the *Vine*, wounded in the *Spring-time*, which always tastes tartish, and ferments like the *Grapes* themselves.

This Juice may be esteem'd as yet fossil, being generated of and in the Earth; for the Juice of the Earth being receiv'd into the Canals of this Plant, retains its Nature during two or three Circulations, nor does immediately commence a vegetable Juice.

This Class of Juices therefore he accounts as the *Chyle of the Plant*, being chiefly found in the first Order of Vessels, *viz.* in the Roots and the Body of the Plant, which answer to the Stomach and Intestines of Animals.

2. The second Class of the Juices is that of the Leaves, which are the real Lungs of Plants, and accordingly make a further Change of the Juice, which they receive from the Roots and Stem by Force of the Air. The Juice of Leaves is different therefore from the first Juice, as being more sulphureous and farther elaborated; not that it derives any Sulphur from the Sun, but that its watery Part exhaling, it becomes more oily and less volatile.

The Juice of Leaves he distinguishes into three Kinds:

The first is the *nutritious Juice* of the Leaves; which is that already describ'd, only farther elaborated in the minute *Vesiculæ* of the Leaves, and consequently less and watery, and more oily and saccharine.

The second is *Wax*, which exuding out of the Leaves, adheres to the Surface, and is scrap'd off by Bees with their rough Thighs to build their Combs withal. This is chiefly afforded by *Lavender* and *Rosemary*: Upon the latter of which the *Wax* may be plainly perceiv'd sticking to the Leaves of it.

The third is *Manna*; not that with which the *Israelites* were fed in the Desert, but a Drug sold among us: It is an essential saccharine Salt, exuding chiefly by Night, and in the *Summer Season*, from the Leaves of a sort of

of *Ash* growing in *Calabria* and *Sicily*, and adhering thereto in the Form of a Crust, to be gather'd the next Morning ere the Sun is up.

The like Substance is found to exsude from the Leaves of the *Linden-tree* and *Poplar*, in the Heats of *May* and *June*; at which Time they have a honey Taste, and are even seen with a fatty Juice on them, which at the Approach of the cold Evening gathers into Grains.

3. The third Class of *Juices* are those of Flowers, or the genital Parts of Plants. In these are,

First, a pure, elaborated, volatile Oil or Spirit, wherein the particular Smell of the Plant or Flower resides, and which by reason of its extreme Volatility, exhales spontaneously, inasmuch, that if the Flower be laid for some time in a warm Place, the odorous Juice or Spirit will be all fled.

The *Second*, is the Juice express'd from the Flower, which, in Reality is the same with that of the Root and Leaves, only farther prepared; it is thicker than the former, and has scarce any Smell at all: Thus, if you bruise a *Hyacinth*, or other fragrant Flower, and express the Juice, it will be found altogether inodorous.

The *Third* is the sweet Juice called *Honey*, which exsudes from all Flowers; *Aloes*, *Colocynthis*, and other bitter Flowers not excepted.

In all Male Flowers that have Utricles at the Bottom of the *Petala*, is found a viscid, ruddy, sweet Juice in some Plenty; and accordingly we see the Children gather *Cowslips*, *Fox-gloves*, *Honeysuckles*, &c. and suck the Honey from them: The Bees too visit these Flowers, and putting in their Proboscides or Trunks, suck out the Honey, and load their Stomachs therewith, to be afterwards discharg'd and laid up in their Combs: So that Honey is a vegetable Juice.

4. The fourth Class of *Juices* are those of the *Fruit* and *Seed*, the Preparative whereof is Nature's final Work: Which perform'd, the Plants seem to die for a time, as all Animals are seen to languish after the Emission of their *Semen*.

The Juice of the Fruit is like that of the Root, only farther elaborated.

The Juice of the Seed is an *essential Oil* or *Balm*, elaborated and exalted to its last Perfection. This Juice or Oil is not found in the very Point or Embryo in the Centre of the *Placenta*; all we meet with in that Part is a few fine watery Particles secreted from the *Placenta*; but it is in the *Placentula* or *Cotyledones* themselves, which consist of innumerable little *Folliculi* or Cells, wherein this only Juice is contain'd, serving to defend the *Embryo*, and preserve it from being corrupted by Water, which it is well known will hardly pass through Oil.

Thus, if you take, e. g. *Fennel-Seed*, cut it through the Middle, and apply it to the Microscope, you will easily perceive a clear shining Oil in the Cells of each Lobe investing the

tender *Embryo*. Without this Oil it were impossible a Seed should live a Month, and much less a Year or two, intire and uncorrupted in the Ground.

This Oil is found in the Seeds of all Plants; in some, *ex. gr.* in *Almonds*, *Cocoa-Nuts*, &c. in very great Quantities; in others less, as *Pepper*, *Arum*, &c. where one would scarce imagine any Oil at all.

5. The fifth Class of *Juices* is those of the Bark; which is an artful Congeries or Bundle of perspirative Ducts and absorbent Vessels.

Of these Juices there are divers Species; for the several Humours rais'd and distributed through the Leaves, Flowers, and other Parts of the Plants, have all circulated through the Bark, and accordingly are frequently found to distil from Wounds made therein. In some Cases, even the whole Plant is no more than Bark, the Pulp having been eat out; as in *Willows*, *Poplars*, &c. which will live a long time in that State.

The Bark serves divers Purposes, for it not only transmits the nutritious Juices of the Plant, but also contains divers fat oily Humours, to defend the fleshy Parts from the Injuries of the Weather.

6. As Animals are furnish'd with a *Panniculus Adiposus*, usually replete with Fat, which invests and covers all the fleshy Parts, and screens them from external Cold; so are Plants encompass'd with a Bark replete with fat Juices, by the Means whereof the Cold is kept out, and in *Winter-time* the *Spicula* of Ice prevented from fixing and freezing the Juices in their Vessels; whence it is that some Sorts of Trees remain ever green the Year round, by reason their Barks have more Oil than can be spent, and exhal'd by the Sun, &c.

All the Juices of Barks are reducible to eight, *viz.*

1. The crude, acid, watery Juice, call'd the *Chyle* of the Plant.

2. An oily Juice, which bursting the Bark in the Beginning of the *Summer*, exsudes out of divers Plants, as *Beech*, *Pine*, *Fir*, *Savin*, *Juniper*, and other Ever-greens, and such alone. This Oil dissolves by the smallest Degree of Warmth, and is easily inflam'd, and is that which defends the Plant, which is the Reason why these Plants will not thrive in very hot Climates.

3. A *Balm* or fatty Liquor more glutinous than Oil, being nothing but the last-mention'd oily Juice, which was more fluid during the *Spring-time*; but which, by the greater Heat of the Sun, has evaporated all its most subtile Parts, and is converted into a denser Liquor: Thus the finer Part of Oil of *Olives* being exhale'd by the *Summer's* Warmth, there remains a thick Balsam behind: Thus also Oil of *Turpentine*, having lost its more liquid Parts by Heat, becomes of the thick Consistence of a *Balm*.

4. A *pitchy Juice*, which is the Body of the Oil itself inspissated and turn'd black farther than in the *Balm*. This is the most observ'd in the *Pine* and *Fir*.

5. *Resin*,

5. *Rosin*, which is an Oil so far inspissated, as to become friable in the Cold, and may be procur'd from any Oil, by boiling it much and long. Thus, if *Turpentine* be set over a gentle Fire, it first dissolves, and becomes an Oil, then a *Balsam*, then *Pitch*, and then a *Rosin*; in which State it is friable in the Cold, fusible by Fire, and withal inflammable and combustible; dissoluble in Spirit of Wine, but not in Water, which makes the Character of *Rosin*.

Hence the Oil is most abundant in the Barks in the *Winter*-time, the *Balsams* in *Summer*, and the *Rosin* in *Autumn*.

6. *Colophony*, which is a *Rosin* still farther exhausted of its volatile Part, being pellucid, friable, and approaching to the Nature of Glass.

7. *Gum*, which is a Humour exuding out of the Bark, and by the Warmth of the Sun concocted, inspissated, and render'd tenacious, but still dissoluble in Water, and at the same time inflammable, and scarce capable of being pulveriz'd.

With this the Gems or Buds of Trees are cover'd in *Winter*-time.

8. A *gummosus Rosin*, which is a Humour secreted in the Bark, and dry'd by the Heat of the Sun; and thus constituting a Body that is partly gummosus, and as such tenacious and soluble in Water; and partly resinous, and therefore friable, and soluble in Oil or Spirit of Wine, but not in Water.

Botanists are now generally agreed, that all Plants are furnish'd with Organs and Parts necessary both for Chylification and Sanguification; that they have Veins, Arteries, Heart, Lungs, Adipose, Celules, &c. If so, it is obvious, that there must be some Difference between the Juices, which have not undergone the Action of those Parts, and such as have already circulated a Number of Times.

The several Juices hitherto recounted, are the first or *Nutritious Juice*, call'd also the *Chyle* of the Plant, under such Alterations and new Modifications as it undergoes in being receiv'd and kept some time in Parts of a peculiar Structure, as Leaves, Flowers, Seed, &c. This last Juice, call'd the *Blood*, is the same nutritious Juice farther alter'd, by being divers times pass'd through each of those Parts and remix'd, and at length converted into a new Juice, with Properties different from any of them all.

To prove the Circulation of the *Sap*, Instances are brought from Experiments made by Mr. Fairchild, as his budding or inoculating of a *Passion-tree*, whose Leaves were spotted with yellow, into one of that Sort of *Passion-tree* whose Leaves are plain; for tho' the Buds did not take, yet after it had been budded a Fortnight, the yellow Spots began to shew themselves about three Feet above the Inoculation; and in a little time after that, the yellow Spots appear'd on a Shoot, which came out of the Ground from another Part of the Plant; which has been accounted a plain Proof of the *Sap's* Circulation.

Another Instance is, another Experiment of the same Person, who grafted the Ever-green *Oak*, or *Ilex* upon the common *Oak*: The Leaves of the common *Oak*, which was the Stock decay'd, and fell off at the usual Season of the Year; but the ever-green *Oak*, which was the *Cyon* grafted upon it, held its Leaves, and continu'd shooting in the *Winter*: From whence it is concluded, that when Trees drop their Leaves, the *Sap* keeps full in Motion, and is not gone into the Root, as some Persons think.

There are also other Experiments of the same Person, which were shewn before the *Royal Society*; as the *New-England Cedar*, or rather *Juniper* grafted on the *Virginian*: And what is taken to prove the Circulation in it, is, the Branch which is grafted was left several Inches below the Grafting, which continued growing as well as the upper Part above the Grafting.

And also another, which is the *Viburnum*, with the Top planted in the Ground, which was become Roots; and the Roots turn'd up, which were become Branches; which Plant was in as good a State of growing as it was in its natural State.

A third Experiment of his was on a *Pear-tree*, which he inarched upon two *Pear* Stocks in *March* 172 $\frac{1}{2}$, having the Roots out of the Ground, and was in as good flourishing State, with a Branch in blossom, that receives no other Nourishment but by the Juices that return down the other two Branches; which tho' it had been done above two Years, yet it continu'd shooting Suckers out of the Root; which is esteem'd as a Proof, that the Branches are as useful to support the Roots as the Roots the Branches: And thence he infers, that it is not strange that so many Trees miscarry in planting, when there are no Branches left to the Head to maintain the Circulation to the Roots.

A fourth Experiment he made on the *Cedar* of *Lebanon*, grafted on the *Larix*, which drops its Leaves in the *Winter*, yet maintain'd the *Cedar* in a flourishing Condition, as if it had been on a Tree which held its Leaves all the *Winter*, and the Circulation of Juices supported the Graft below the Grafting, and kept it in as good Health as above the Grafting.

In Opposition to the Notion of the Circulation of the *Sap* in Trees like to that in animal Bodies, the Reverend Mr. Hales, in his excellent Treatise of *Vegetable Statics*, presents us with various Experiments, and says,

When the *Sap* has first pass'd through that thick and fine Strainer, the Bark of the Root, we then find it in greatest Quantities in the most lax Part, between the Bark and Wood, and that the same through the whole Tree.

And if in the early *Spring*, the *Oak*, and several other Trees were to be examin'd near the Top and Bottom, when the *Sap* first begins to move, so as to make the Bark run and easily peel off, he believes it would be found, that the lower Bark is first moisten'd; whereas the Bark of the top Branches ought first to be

be moisten'd, if the *Sap* descends by the Bark: As to the *Vine*, he says, he is pretty well assur'd, that the lower Bark is first moisten'd.

He adds, that it is to be seen in many of the Examples of the Experiments he has given in that Book, what Quantities of Moisture Trees do daily imbibe and perspire: Now the Celerity of the *Sap* must be very great, if that Quantity of Moisture must most of it ascend to the Top of the Tree, then descend and ascend again before it is carry'd off by Perspiration.

The Defect of a Circulation in Vegetables seems, in some measure, to be supply'd by the much greater Quantity of Liquor, which the Vegetable takes in, than the Animal, whereby its Motion is accelerated: For, by the first Example he gives, we find the *Sun-flower*, Bulk for Bulk, imbibes and perspires seventeen times more fresh Liquor than a Man every twenty-four Hours.

Besides, Nature's great Aim in Vegetables being only that the Vegetable Life be carry'd on and maintain'd, there was no Occasion to give its *Sap* the rapid Motion which was necessary for the Blood of Animals.

In Animals it is the Heart which sets the Blood in Motion, and makes it continually circulate; but in Vegetables we can discover no other Cause of the *Sap's* Motion, but the strong Attraction of the Capillary *Sap* Vessels, assisted by the brisk Undulation and Vibrations caus'd by the Sun's Warmth, whereby the *Sap* is carry'd up to the Top of the tallest Trees, and is there perspir'd off thro' the Leaves: But when the Surface of the Tree is greatly diminish'd by the Loss of its Leaves, then also the Perspiration and Motion of the *Sap* is proportionably diminish'd; as is plain from many of his Experiments.

So that the ascending Velocity of the *Sap* is principally accelerated by the plentiful Perspiration of the Leaves thereby making Room for the fine Capillary Vessels to exert their vastly attracting Power; which Perspiration is effected by the brisk rarefying Vibrations of Warmth; a Power that does not seem to be any ways well adapted to make the *Sap* descend from the Tops of Vegetables by different Vessels to the Root.

If the *Sap* circulated, it must needs have been seen descending from the upper Part of large Gashes, cut in Branches, set in Water, and with Columns of Water pressing on their Bottoms in long Glass Tubes, in his forty-third and forty-fourth Experiment.

In both which Cases it is certain, that great Quantities of Water passed through the Stem, so that it must needs have been seen descending, if the Return of the *Sap* downwards were by Trusion or Pulsion, whereby the Blood in Animals is return'd through the Veins to the Heart, and that Pulsion, if there were any, must necessarily be exerted with prodigious Force, to be able to drive the *Sap* thro' the finer Capillaries.

So that if there be a Return of the *Sap* downwards, it must be by Attraction, and that a

very powerful one, as may be seen by many of these Experiments, and particularly by Experiment 11. But it is hard to conceive what and where that Power is which can be equivalent to that Provision Nature has made for the Ascent of the *Sap*, in consequence of the great Perspiration of the Leaves.

The Instances of the *Jessamine-tree*, and of the *Passion-tree*, have been look'd upon as Proofs of the Circulation of the *Sap*, because their Branches, which were far below the inoculated Bud, were gilded: But we have many visible Proofs in the *Vine*, and other bleeding Trees, of the *Sap's* receding back, and pushing forwards alternately at different times of the Day and Night: And there is great Reason to think, that the *Sap* of all other Trees has such an Alternate Receding and progressive Motion, occasion'd by the Alternacies of Day and Night, Warm and Cool, Moist and Dry.

For the *Sap* in all Vegetables does probably recede, in some measure, from the Tops of Branches as the Sun leaves them, because its rarefying Power then ceasing, the greatly rarefy'd *Sap* and Air mix'd with it, will condense, and take up less Room than they did, and the Dew and Rain will then be strongly imbib'd by the Leaves, as is probable from Experiment 42, and several others, whereby the Body and Branches of the Vegetable which have been much exhausted by the great Evaporation of the Day, may, at Night, imbibe *Sap* and Dew from the Leaves.

For by several Experiments in the first Chapter of the aforesaid Book of *Vegetable Statics*, Plants were found to increase considerably in Weight in dewy and moist Nights.

And by other Experiments on the *Vine* in the third Chapter it was found, that the Trunk and Branches of *Vines* were always in an imbibing State, caus'd by the great Perspiration of the Leaves, except in the bleeding Season; but when at Night that perspiring Power ceases, then the contrary imbibing Power will prevail, and draw the *Sap* and Dew from the Leaves as well as Moisture from the Roots.

And we have a further Proof of this in Experiment 12, where by fixing Mercurial Gages to the Stems of several Trees, which do not bleed, it is found, that they are always in a strongly imbibing State, by drawing up the Mercury several Inches: Whence it is easy to conceive, how some of the Particles of the gilded Bud in the inoculated *Jessamine* may be absorb'd by it, and thereby communicate their gilding *Miasma* to the *Sap* of other Branches; especially when some Months after the Inoculation, the Stock of the inoculated *Jessamine* is cut off a little above the Bud, whereby the Stock, which was the counter-acting Part to the Stem, being taken away, the Stem attracts more vigorously from the Bud.

Another Argument for the Circulation of the *Sap* is, that some Sorts of Grafts will infect and canker the Stocks they are grafted on: But by Experiment 12 and 37, where Mercurial Gages were fix'd to fresh cut Stems of Trees,

Trees, it is evident that those Stems were in a strongly imbibing State; and consequently the cankered Stocks might very likely draw Sap from the Graft, as well as the Graft alternately from the Stock; just in the same manner as Leaves and Branches do from each other in the Vicissitudes of Day and Night.

And this imbibing Power of the Stock is so great, where only some of the Branches of the Stock will, by their strong Attraction, starve those Grafts; for which Reason, it is usual to cut off the greatest Part of the Branches of the Stock, leaving only a few small ones to draw up the Sap.

The Instance of the *Hlex* grafted upon the *English Oak*, seems to afford a very considerable Argument against a Circulation: For if there were a free uniform Circulation of the Sap through the *Oak* and *Hlex*, why should the Leaves of the *Oak* fall in Winter, and not those of the *Hlex*?

Another Argument against an uniform Circulation of the Sap in Trees as in Animals, may be drawn from Mr. *Hales's* 37th Experiment, viz. where it was found by the three Mercurial Gages fix'd to the same Vine, that while some of its Branches chang'd their State of protruding Sap into a State of imbibing, others continu'd protruding Sap, one nine, and the other thirteen Days longer.

That the Sap does not descend between the Bark and the Wood, as the Favourers of a Circulation suppose, seems evident from hence, viz. That if the Bark be taken off for three or four Inches Breadth quite round, the Bleeding of the Tree above that bared Place will much abate; which ought to have the contrary Effect, by intercepting the Course of the resluent Sap, if the Sap descended by the Bark.

But the Reason of the Abatement of the Bleeding in this Case may well be accounted for, from the manifest Proof we have in these Experiments, that the Sap is strongly attracted upwards by the vigorous Operation of the perspiring Leaves and attracting Capillaries: But when the Bark is cut off for some Breadth below the bleeding Place, then the Sap which is between the Bark and the Wood below that disbarked Place is depriv'd of the strong attracting Power of the Leaves, &c. and consequently the bleeding Wound cannot be supply'd to fast with Sap as it was before the Bark was taken off.

But the most considerable Objection against this progressive Motion of the Sap without a Circulation, arises from hence, viz. That 'tis too precipitate a Course for a due Digestion of the Sap in Order to Nutrition: Whereas in Animals, Nature has provided that many Parts of the Blood shall run a long Course before they are either apply'd to Nutrition, or discharged from the Animal.

But when we consider, that the great Work of Nutrition in Vegetables as well as Animals (I mean after the Nutrient is got into the Veins and Arteries of Animals) is chiefly carry'd on in the fine Capillary Vessels, where Nature selects and combines, as shall best suit

her different Purposes, the several mutually attracting nutritious Particles, which were hitherto kept disjoin'd by the Motion of their fluid Vehicle; we shall find that Nature has made an abundant Provision for this Work in the Structure of Vegetables; all whose Composition is made up of nothing else but innumerable fine capillary Vessels and glandulous Portions or Vesicles.

Upon the whole, he thinks we have, from these Experiments and Observations, sufficient Ground to believe that there is no Circulation of the Sap in Vegetables; notwithstanding many ingenious Persons have been induc'd to think there was, from several curious Observations and Experiments, which evidently prove, that the Sap does, in some measure, recede from the Top towards the lower Parts of Plants, whence they were, with good Probability of Reason, induc'd to think that the Sap circulated.

SAPONARIA; vide *Lychnis*.

SATUREJA, [so call'd, because it is said to cause a *Satyriasmus* or *Priapismus*, for it very much excites to Venery, and carries a Warmth to the *Membrum virile*.] Savory.

The Characters are;

It is a Plant of the verticillate Kind, with a labiated Flower, whose Upper-lip, or Crest, is divided into two Parts; but the Lower-lip, or Beard, is divided into three Parts, the middle Part being crenated: These Flowers are produced from the Wings of the Leaves, in a loose Order, and not in Whorles or Spikes, as are most of this Tribe of Plants.

The Species are;

1. SATUREJA, *sativa*. J. B. Garden or Summer Savory.

2. SATUREJA; *montana* C. B. P. Winter Savory.

3. SATUREJA; *Virginiana*. Par. Bat. Virginian Savory.

The first of these Plants is annual, and is propagated by sowing of the Seeds, upon a Bed of light, fresh Earth, in March; and when the Plants are come up, they must be transplanted into other Beds, placing them about four or five Inches asunder each Way; observing to do this in moist, cloudy Weather, because at such Times the Plants will soon take Root; but if the Season should prove hot and dry, they must be diligently watered until they have taken Root, after which they will require no farther Care, but to keep 'em clear from Weeds; and in July they will flower, at which Time they should be cut for medicinal Use; but those Plants which are left will produce ripe Seeds in September, provided the Autumn be favourable.

The Winter Savory is an abiding Plant, and may be propagated by Slips or Cuttings, which, if planted in a Bed of light, fresh Earth, in the Spring, and carefully watered, will take Root in a short Time, and may then be transplanted where they are to remain. This Plant should have a dry Soil, in which it will endure the Cold very well, as may be seen

seen by its growing in some Places upon the Tops of Walls, where it defies the severest Cold of our Climate.

These Plants were formerly more cultivated in England than at present, they being very little in use to what they were formerly, when they enter'd most Dishes of Soups, &c. but at present they are very little used in the Kitchen, and are chiefly cultivated for medicinal Use.

SATYRION; *vide* Orchis.

SAVIN; *vide* Sabina.

SAVORY; *vide* Satureja.

SAXIFRAGA, [so call'd, *q. Saxa*, Stones, and *frangens*, Lat. *breaking*; because, as *Bauhinus* says, the Juice of it being drank, breaks the Stone in the Reins and Bladder; but the Truth of it is doubted. Others derive it from its growing on stony Mountains; as growing out of the Clefts of the Stones.] Saxifrage.

The Characters are;

The Flower consists of several Leaves, placed orbicularly, which expand in Form of a Rose; out of whose multifid Flower-cup rises the Pointal, which commonly ends in two Horns, and afterwards turns, together with the Flower-cup, into a roundish Fruit, which has likewise two Horns, and two Cells, which are full of small Seeds.

The Species are;

1. SAXIFRAGA; *rotundifolia*, *alba*. C. B. P. White round-leav'd Saxifrage.

2. SAXIFRAGA; *rotundifolia*, *alba*, *flore pleno*. Beerb. Ind. White round-leav'd Saxifrage with a double Flower.

3. SAXIFRAGA; *Alpina ericoides*, *flore cæruleo*. Tourn. Mountain Heath-like Sengreen with a blue Flower.

4. SAXIFRAGA; *sedi folio*, *flore albo*, *multiflora*. Tourn. Many-flower'd Saxifrage with a House-leek Leaf and a white Flower, commonly called Pyramidal Sedum.

5. SAXIFRAGA; *sedi folio*, *angustiore*, *serrato*. Tourn. Saxifrage with a narrow, serrated, House-leek Leaf.

The first of these Plants is very common in moist Meadows, in divers Parts of England, and is rarely cultivated in Gardens. This is what the College of Physicians have directed to be used in Medicine, under the Title of *White Saxifrage*, to distinguish it from *Meadow Saxifrage*, which is an umbelliferous Plant, of a very different Nature and Appearance from this.

The second Sort is a Variety of the first, which was found wild by Mr. Joseph Blind, Gardener at Barns, who transplanted it into his Garden, and afterwards distributed it to several curious Persons; since which Time it hath been multiplied so much, as to become a very common Plant in most Gardens near London, where it is commonly planted in Pots, to adorn Court-yards, &c. in the Spring.

This Plant is propagated by Off-sets, which are sent forth from the old Roots in great Plenty. The best Season for transplanting

them is in July, after their Leaves are decay'd, when they must be put into fresh undung'd Earth, and placed in the Shade until Autumn; but in Winter they may be exposed to the Sun, which will cause 'em to flower somewhat earlier in the Spring. In April these Plants will flower, and if they are in large Tufts, will at that Time make a very handsome Appearance; for which Reason most People suffer them to remain three or four Years unremoved, and when they are transplanted, do always plant 'em in Bunches, that they may produce a greater Number of Flowers. If these Plants are put into the full Ground, they must have a shady Situation, otherwise they will not thrive.

The third Sort is a low, creeping Plant, which lies upon the Surface of the Ground, somewhat like Moss; this grows wild in the Northern Counties of England, and is rarely cultivated in Gardens.

The fourth Sort is propagated for the Sake of its specious Flowers. This is brought from the Alps and Pyrenean Mountains, where it grows wild: It is usually planted in Pots, fill'd with fresh, light Earth, and in the Summer Season placed in the Shade, but in the Winter it should be exposed to the Sun; and all the Off-sets should be taken off, leaving the Plant single, which will cause it to produce a much stronger Stem for Flowering; for when there are Off-sets about the old Plant, they exhaust the Nourishment from it, whereby it is rendred much weaker. These Off-sets must be each planted in a separate halspenny Pot, fill'd with fresh Earth, in order to succeed the older Plants, which generally perish after Flowering: These Off-sets will produce Flowers the second Year, so that there should be annually some of them planted, to succeed the others. When these Plants are strong and healthy, they will produce a Stem of Flowers full three Feet high, which divides into Branches in a pyramidal Order, and are beset with Flowers from Bottom to Top, so as to make a beautiful Figure; and as it usually flowers in June, so it is commonly placed in Chimnies of Halls, where it will continue in Flower a long Time, provided it have Water duly given it, and will afford an agreeable Prospect.

The fifth Sort is also a Native of the Alps, but will grow very well in Gardens; and tho' the Flowers are not very beautiful, yet for the Variety of its serrated, ever-green Leaves, it may have a Place in every good Garden. This may be propagated by Off-sets, and requires the same Management as the former.

SCABIOSA, [so call'd of *Scabies*, Lat. a *Scab*, because this Plant is said to heal the Scab.] Scabious.

The Characters are;

It hath a flosculous Flower, consisting of many unequal Florets, contained in a common Empalement. Some of these which occupy the Middle, are cut into four or five Segments; the rest which are placed at the Edge, are bilobed; each of these sits on the Top of an Embryo,

bryo, which is crowned; and is contained in a proper Empalement, which afterwards becomes a Capsule, either simple or Funnel-shap'd, pregnant with a Seed crown'd, which before was the Embryo.

The Species are;

1. SCABIOSA; *pratensis, hirsuta, quæ officinarum*. C. B. P. Common Field Scabious.

2. SCABIOSA; *integrifolia glabra, radice præmorsâ*. H. L. Whole-leav'd Scabious, or Devil's-bit.

3. SCABIOSA; *stellata, folio non dissecto*. C. B. P. Starred Scabious with an undivided Leaf.

4. SCABIOSA; *stellata, folio laciniato major*. C. B. P. Greater starred Scabious with a cut Leaf.

5. SCABIOSA; *peregrina, rubra, capitulo oblongo*. C. B. P. Red Indian Scabious with longish Heads, commonly called Musk Scabious.

6. SCABIOSA; *peregrina, capitulo oblongo, flore carneo*. H. R. Par. Indian or Musk Scabious, with longish Heads and a flesh-colour'd Flower.

7. SCABIOSA; *peregrina, capitulo oblongo, flore atropurpureo*. H. R. Par. Indian or Musk Scabious with longish Heads and a dark purple Flower.

8. SCABIOSA; *peregrina, capitulo oblongo, flore variegato*. H. R. Par. Indian or Musk Scabious with oblong Heads and a variegated Flower.

9. SCABIOSA; *Indica, prolifera*. H. Edinb. Indian childing Scabious.

10. SCABIOSA; *Africana, frutescens*. Par. Bat. Ic. African shrubby Scabious.

11. SCABIOSA; *Africana, frutescens, folio rigido splendente serrato, flore albicante*. H. A. African shrubby Scabious with a stiff, shining, serrated Leaf, and a whitish Flower.

12. SCABIOSA; *Alpina, folio centaureæ majoris*. C. B. P. Alpine Scabious with a greater Centaury Leaf.

There are many other Sorts of Scabious's, which are preserved in Botanick Gardens for Variety; but those here mention'd are the principal Sorts which are propagated for the Beauty of their Flowers. The first Sort here mention'd grows wild in divers Parts of England, upon Arable Land; as doth the second in Woods and shady Places almost every where: The first of these is what the College of Physicians have directed to be used, under the Title of Scabious; though the People who supply the Markets do generally bring the second Sort instead thereof; but it may be easily known therefrom by its hairy, divided Leaves. The second Sort the College have directed to be used under the Title of Devil's-bit, which Name it received from the lower Part of its Root being commonly eaten off.

Both these Plants are very common in the Fields and Woods, but may be propagated in Gardens, by sowing their Seeds in the Spring upon a Bed of fresh Earth; and when the Plants are come up, they must be transplanted into other Beds of fresh Earth, at about eight or ten Inches distance, observing to water 'em until they have taken Root, after which

they will require no further Culture, but to keep 'em clear from Weeds, and the second Summer they will flower and produce Seeds, but their Roots will abide many Years, and may be parted, to propagate the Species.

The third Sort will grow to the Height of four or five Feet, and have a woody Trunk. This is preserved in Green-houses in Winter, by such as are curious in foreign Plants. It may be propagated by planting Slips or Cuttings in Pots of fresh Earth, during any of the Summer Months, which, if placed in a moderate Hot-bed, watered and shaded, will take Root in a short time; after which they may be inured to the open Air by Degrees, into which they should be removed to continue abroad until October, when they must be carried into Shelter, but must have as much free Air as possible in mild Weather; for they only require to be protected from hard Frost, and to be frequently watered. This Plant produces Flowers most part of the Year, for which it is chiefly preserved, tho' the Flowers have not more Beauty nor Scent than the common Field Sort.

The fourth Sort is an annual Plant, which is preserved in the Gardens of the Curious; but the Flowers of this are very like those of the former Sort, and have no Scent.

The Indian or Musk Scabious's are preserv'd for the Beauty and sweet Scent of their Flowers, which continue a long time: These are propagated by sowing of their Seeds, the best Time for which is about the latter End of May or the Beginning of June, that the Plants may get Strength before Winter; for if they are sown too early in the Spring, they will flower the Autumn following, and the Winter coming on soon, will prevent their ripening Seeds; besides, there will be fewer Flowers upon those, than if they had remained strong Plants thro' the Winter, and had sent forth their Flower-stems in Spring, for these will branch out on every Side, and produce a prodigious Number of Flowers, and continue a Succession of them on the same Plants, from June to September, and produce good Seeds in Plenty.

The Seeds of these Plants should be sown upon a shady Border of fresh Earth (for if they are sown upon a Place too much exposed to the Sun, and the Season should prove dry, few of them would grow): When the Plants are come up, they may be transplanted into other Beds or Borders of fresh Earth, observing to water and shade them until they have taken Root, after which they will require no farther Care, but to keep 'em clear from Weeds, 'till Michaelmas, when they may be transplanted into the Middle of the Borders in the Pleasure-Garden, where the several Sorts being intermixed, will make an agreeable Variety. They are extream hardy, being rarely injured by Cold, unless they have shot up to flower before Winter, but do seldom continue after ripening their Seeds.

The two African Tree Scabious's are abiding Plants, which are preserved in Pots, and housed in Winter, as the third Sort. These

may be propagated by Slips or Cuttings, as the third, and require the same Management.

The twelfth Sort is preserved by such as are curious in collecting Varieties of Plants, but the Flowers have no Scent; however, as it is a hardy Plant, requiring no other Culture than the common Field Sorts, so it may be admitted, for Diversity, into the Pleasure-Garden, because it will thrive in shady Places, where few other Plants will grow.

SCILLA, [so called of *σκίλλω*, to make dry, because this Plant grows in dry Places; or, as others will have it, of *σκύλλω*, I am molested, because the Bulb of this Plant, by its Acrimony, irritates the Parts to which it is apply'd.] Squils.

The Characters are;

It hath a large, acrid, bulbous Root, like an Onion: The Leaves are broad; the Flowers are like those of *Ornithogalum*, or the starry *Hya-cinth*: They grow in a long Spike, and come out before the Leaves.

The Species are;

1. **SCILLA**; *vulgaris*, *radice rubra*. C. B. P. Common red Squil.

2. **SCILLA**; *radice alba*. C. B. P. The White Squil.

These Plants are very common upon the sandy Shoars of Spain and the Levant, from whence their Roots are annually brought to England, for Medicinal Use. But I was lately informed by a Letter from Dr. William Stevens, Professor of Botany at Dublin, that the *White Squil* grows in great Plenty upon the Sea Coast of the County of Kerry in Ireland; which is the only Place in which it has been found growing wild in these Parts of Europe. But altho' these Roots are brought over chiefly for Medicinal Use, yet are they worthy of being cultivated in every good Garden, for the Beauty of their Flowers, which make a very handsome Appearance when they are strong Roots.

The best Time to transplant these Roots is in May, when their Leaves are decay'd; or if the Roots are brought from abroad, if they can be procured firm at that Season, or a little after, they should be planted in Pots of light, sandy Earth, and placed in the Windows of the Green-house, where, if they are blowing Roots, they will flower the July following.

These Plants must be preserved in Shelter during the Winter Season, because if their Leaves are destroy'd by Frost in Winter, the Roots are subject to perish; but in Summer they should be exposed to the open Air, and in dry Weather they must be frequently watered, especially during the Season their Leaves are on, or that they are in Flower; but when the Roots are in a State of Rest, they should have but little Moisture, for Wet at that Time will rot them. They are pretty hardy, and do only require to be sheltered from hard Frost; but must have as much free Air as possible in open Weather.

SCLAREA, [this Plant is so called of *σκληρό*, hard, because it has a hard and dry Stalk.] Clary.

The Characters are;

It is a verticillate Plant with a labiated Flower, consisting of one Leaf, whose Upper-lip, or Crest, is hooked, but the Under-lip, or Beard, is divided into three Parts, the middle Segment being hollow and bifid; out of the Flower-cup rises the Pointal, attended by four Embryo's, which afterwards turn to so many roundish Seeds, enclosed in a Husk, which was before the Flower-cup.

The Species are;

1. **SCLAREA**; *Tabern. Ic.* Common Garden Clary.

2. **SCLAREA**; *vulgaris*, *lanuginosa*, *amplifimo folio*. Tourn. Common downy Clary with a large Leaf.

3. **SCLAREA**; *laciniatis foliis*. Tourn. Clary with jagged Leaves.

4. **SCLAREA**; *Lusitanica*, *glutinosa*, *amplifimo folio*. Tourn. Portugal Clary with a large glutinous Leaf.

5. **SCLAREA**; *Indica*, *flore variegato*. Tourn. Indian Clary with a variegated Flower.

6. **SCLAREA**; *rugoso*, *verrucoso*, & *laciniato folio*. Tourn. Clary with a rough, warted and jagged Leaf.

7. **SCLAREA**; *glutinosa*, *floris lutei*, *variegati*, *barbâ amplâ cavâ*. Boerb. Ind. Glutinous Clary with a yellow variegated Flower, having a large hollow Beard, commonly called Jupiter's Distaff.

8. **SCLAREA**; *folio salviae*, *minor*, *seu glabra*. Tourn. Lesser or smooth Clary with a Sage Leaf.

9. **SCLAREA**; *Orientalis*, *folio Betonica acutissimo*, *comâ purpurascens*. T. Cor. Eastern Clary with a sharp-pointed Betony Leaf and a purplish Top.

10. **SCLAREA**; *pratensis*, *foliis serratis*, *flore suave rubente*. Tourn. Meadow Clary with serrated Leaves, and a soft red Flower.

The common Garden Clary is chiefly cultivated in England for medicinal Use, but the other Sorts are preserved in Botanick Gardens, for the Sake of Variety, with many other Sorts of less Note; however, those here mentioned are worthy of a Place in large Gardens, where, if they are intermix'd among other large growing Plants, they will afford a pretty Variety, especially the fifth, eighth, ninth, and tenth Sorts, which produce long Spikes of beautiful Flowers, and continue a long Time in Flower.

All these Sorts may be propagated by sowing of their Seeds upon a Bed of fresh Earth in March, and when the Plants are come up, they should be transplanted into Beds of fresh Earth, about eight Inches asunder, observing to water 'em until they have taken Root, after which they will require no farther Care, but to keep them clear from Weeds until Michaelmas, when they should be transplanted into the Places where they are to remain, placing them at a large Distance, for they spread pretty far, provided the Soil be good. If these Plants are planted for a Crop, intended for medicinal Use, they should be planted in

Rows

Rows two Feet and a half asunder, and the Plants eighteen Inches distant in the Rows: But the other Sorts to be placed in Borders, should be planted eight or ten Feet distant, being intermixed with other Plants. Some of these Sorts will endure many Years, provided they are planted on a fresh Soil, not over moist or rich; but others do rarely continue longer than the second Year, perishing soon after they have perfected their Seeds; these should therefore be often renewed from Seeds, to have a Continuance of 'em; but the other Sorts may be increased by parting their Roots, the best Time for which is at *Michaelmas*, when their Stems begin to decay.

SCORDIUM, [this Plant takes this Name of *exedon*, *Garlick*, because it has the Smell of *Garlick*.] Water Germander.

The Characters are;

The Flowers are like those of Germander, which are produced from the Wings of the Leaves; the Flower-cup is tubulous, and the whole Plant smells like *Garlick*.

The Species are;

1. SCORDIUM; C. B. P. Common Water Germander.
2. SCORDIUM; *alterum*, five *Salvia agre-fis*. C. B. P. Wild Sage, *vulgâ*.
3. SCORDIUM; *frutescens*, *folio angusto Salviae*, *flore luteola*. Boerb. Ind. Shrubby wild Sage, with a narrow Sage Leaf and yellowish Flowers.

The first of these Plants grows wild in moist Places in the Isle of *Ely*, in great Plenty, but near *London* it is propagated in Gardens for medicinal Use. This Plant is increased by parting the Roots, or from Cuttings or Slips; the best Time for this Work is in the Beginning of *March*. These Slips must be planted in Beds of moist Earth, about four or five Inches asunder, observing to water them well until they have taken Root, after which they will require no further Care but to keep 'em clear from Weeds, and in *July* the Plants will be fit to cut for medicinal Use, being at that Time in Flower. But it is not proper to transplant them every Year, for then the Crop will be smaller, therefore every other Year will be sufficient to renew these Beds; nor should they be planted again upon the same Ground, but upon a fresh Spot, otherwise they will not thrive.

The *Wild Sage* is very common in Woods and shady Places in divers Parts of *England*, and is rarely cultivated in Gardens, except by those who are curious in Botany. This may be propagated by sowing the Seeds in the *Spring*, upon a Bed of fresh Earth, and when the Plants are come up, they should be transplanted out, at about a Foot asunder, upon a light, fresh Soil, observing to water them until they have taken Root, after which they will require no further Care, but to keep 'em clear from Weeds, for they are extream hardy, and will abide many Years in almost any Soil or Situation.

The third Sort is of a more tender Nature, and requires to be shelter'd from severe Frost,

to which if it be exposed, it is often destroy'd. This may be propagated by sowing the Seeds as the former, but when the Plants come up, they should be placed in Pots of fresh Earth, and in *Winter* put in an airy Part of the Greenhouse, where they may enjoy the free Air when the Weather is mild, for if they are too much drawn, they are subject to mould and decay. In the *Summer* Season they should be exposed to the open Air, with *Myrtles* and other Foreign Plants, and must be frequently refresh'd with Water.

SCORPIOIDES, [so call'd because the Husk being wreathed, resembles the Tail of a Dragon. It is by some called *Campoides*, of *campus*, a Canker-Worm, and *scorpius*, Form.] Caterpillars.

The Characters are;

It hath a papilionaceous Flower, out of whose Impalement rises the Pointal, which afterwards becomes a jointed Pod, convoluted like a Snail or Caterpillar, having a Seed in each Joint, which is for the most part of an Oval Figure.

The Species are;

1. SCORPIOIDES; *Bupleuri folio*. C. B. P. The great rough Caterpillar.
2. SCORPIOIDES; *Bupleuri folio, corniculis asperis, magis in se contortis & convolutis*. Mor. Hist. Prickly Caterpillar.
3. SCORPIOIDES; *Bupleuri folio, siliquis levibus*. Park. Theat. Smooth-podded Caterpillar.
4. SCORPIOIDES; *siliqua crassa*. Boelii. Ger. Emac. Thick-podded Caterpillar.

These Plants are preserved in several curious Gardens, for their Oddness more than for any great Beauty: They are all of them annual Plants, which are propagated by sowing their Seeds upon a Bed of light, fresh Earth, and when the Plants are come up, they should be thinned, so as to leave 'em about ten Inches or a Foot asunder, because their Branches trail upon the Ground, and if they have not Room, they are apt to over-bear each other, and thereby are very often rotted, especially in moist Seasons. The Weeds should also be diligently clear'd from 'em, otherwise they will grow over and destroy 'em: In *June* these Plants will produce small, yellow, papilionaceous Flowers, which are succeeded by Pods, so much like Caterpillars, that a Person at a small Distance would imagine they were real Caterpillars feeding on the Plants; and it is for this Oddness of their Pods that these Plants are chiefly preserved.

These Plants do seldom thrive well if they are transplanted, therefore the best Method is to put in three or four good Seeds, in each Place where you would have the Plants remain, (which may be in the Middle of large Borders in the Pleasure-Garden, where being intermix'd with other Plants, they will afford a pleasing Variety): When the Plants come up, there should be only one of the most promising left in each Place; which should be constantly kept clear from Weeds, and when their Pods are ripe, they should be gathered and

and preserved in a dry Place 'till the following Spring, in order to be sown.

The first, third, and fourth Sorts are the best worth cultivating, their Pods being large and more visible than the other, and are more in Form of a Caterpillar.

SCORZONERA; [of *Escorfo*, a *Catalonian* Word, signifying a *Viper*, because it is said to be of great Efficacy against the Bite of Vipers. Authors write, that the Herb being apply'd, takes away the Venom of the Bite of Vipers. They say, that if a Viper be touched with this Juice, it languishes: And that a Man may touch Vipers safely, if his Hand be first dipp'd in the Juice of this Plant.] *Viper's-Grafs*.

The Characters are ;

It hath a semi-florescens Flower, consisting of many half Florets, which rest upon the Embryo's, which are included in one common Empalement, which is scaly: The Embryo's do afterwards become oblong Seeds, which are furnish'd with Down.

The Species are ;

1. **SCORZONERA**; *latifolia, sinuata*. C. B. P. Common or broad-leav'd Viper's-Grafs, with an indented Leaf.

2. **SCORZONERA**; *latifolia, altera*. C. B. P. Another broad-leav'd Viper's-Grafs.

3. **SCORZONERA**; *laciniatis foliis*. Tourn. Viper's-Grafs, with jagged Leaves.

The first of these Sorts is what the College of Physicians have directed for Medicinal Use: And it is also cultivated for the Use of the Kitchen in divers Gardens near London, though, at present, it is not so much propagated as it hath been some Years since, when it was more commonly brought to the Markets.

The second Sort is equally as good as the first for all the Purposes for which that is cultivated; but as it is less common, so it is rarely found in England, except in Botanick Gardens, where the third Sort is also cultivated for Variety, but is never apply'd to any Uses.

These Plants may be propagated by sowing their Seeds in the Spring upon a Spot of light fresh Soil. The best Method of sowing them, is, to draw shallow Furrows by a Line about a Foot asunder, into which you should scatter the Seeds, thinly covering them over about half an Inch thick with the same light Earth; and when the Plants are come up, they should be thinned where they are too close in the Rows, leaving them at least six Inches asunder, and, at the same Time, you should hoe down all the Weeds to destroy them: And this must be repeated as often as is necessary; for if the Weeds are permitted to grow among the Plants, they will draw them up weak, and prevent their Growth.

There are many People who sow these Seeds promiscuously in a Bed, and afterwards transplant them out at the Distance they would have them grow: But this is not so well as the former Method, because their Roots do commonly shoot downright, which in being transplanted are often broken, so that they never will make so fair Roots as those which remain

in the same Place where they are sown; for when the extream Part of the Root is broken, it never extends itself in Length afterwards, but only shoots out into many forked small Roots, which are not near so valuable as those which are large and strait. These Roots may be taken up when their Leaves begin to decay, at which time they have done growing; tho' they may remain in the Ground until Spring, and may be taken up as they are us'd: But those which remain in the Ground after March, will shoot up their Flower-stems; after which they are not so good, being sticky and strong.

If you intend to save Seeds of these Plants, you should let a Parcel of the best remain in the Places where they grew; and when their Stems are grown to their Height, they should be supported with Stakes, to prevent their falling to the Ground or breaking. In June they will flower, and about the Beginning of August their Seeds will ripen, when they should be gather'd, and preserv'd dry till the Spring following for Use.

SCROPHULARIA; [so call'd, on account of its resembling *Scrophuli* by its Inequality, not because it is good to cure the *Scrophula* in the Neck, as is vulgarly thought.] *Figwort*.

The Characters are ;

It hath an anomalous Flower, consisting of one Leaf, gaping at both Sides, and generally globular, cut as it were into two Lips; under the upper one of which are two small Leaves: The Pointal rises out of the Flower-cup, which afterwards turns to a Fruit or Husk, with a roundish-pointed End, opening into two Divisions, parted into two Cells by an intermediate Partition, and full of small Seeds, which adhere to the Placenta.

The Species are ;

1. **SCROPHULARIA**; *nodosa fatida*. C. B. P. Stinking knobbed-rooted Figwort.

2. **SCROPHULARIA**; *aquatica, major*. C. B. P. Greater Water Figwort.

3. **SCROPHULARIA**; *Hispanica, sambuci folio glabro*. Tourn. Spanish Figwort, with a smooth Elder-leaf.

4. **SCROPHULARIA**; *maxima, Lusitanica, sambuci folio lanuginoso*. Tourn. Greatest Portuguese Figwort, with a woolly Elder-leaf.

5. **SCROPHULARIA**; *ruta canina dista, vulgaris*. C. B. P. Figwort, commonly called Dogs Rue.

6. **SCROPHULARIA**; *saxatilis lucida, laserpitii Massiliensis foliis*. Boc. Mus. Shining Rock Figwort, with Leaves like the Marseilles Laserwort.

7. **SCROPHULARIA**; *glauco folio, in amplas laciniis diviso*. Tourn. Figwort, with a Sea-green Leaf divided into large Segments.

8. **SCROPHULARIA**; *foliis filicis, modo laciniatis, vel ruta canina latifolia*. C. B. P. Figwort, with Leaves jagged after the manner of Fern, or broad-leav'd Dog's-Rue.

There are several other Species of this Plant which are preserv'd in some curious Botanick Gardens, but those here mention'd being the most

most beautiful, and best worth preserving, it would be needless to enumerate the other Sorts in this Place.

The first Sort here mention'd, grows wild in great Plenty in Woods and other shady Places in divers Parts of *England*, and is rarely cultivated in Gardens; but this being the Sort which the College of Physicians have directed for Medicinal Use, under the Title of *Scrophularia Mijr*, is by some preserved in their Physick-Gardens.

The second Sort is also very common in moist Places, and by the Sides of Ditches almost every where. This is also an officinal Plant, and stands in the Catalogue of Simples, under the Title of *Betonica aquatica*, i. e. *Water-Betony*, because the Leaves are somewhat like those of *Betony*.

These two Plants may be easily propagated in Gardens, by sowing their Seeds early in the Spring upon a Bed of fresh Earth, in a shady Situation; and when the Plants are come up, they should be transplanted out into a strong, moist Soil, about two Feet asunder, observing to water them until they have taken Root; after which they will require no farther Care but to hoe down the Weeds between them from time to time as they are produc'd. The second Year these Plants will shoot up to flower, and if their Stems are suffer'd to remain, they will produce Seeds; but the Herb is generally cut for Use just as the Flowers begin to open; for if it stands longer the Leaves change, and the whole Plant contains much less Juice. These Roots will abide many Years without renewing, but it will be proper to transplant them every other Year, otherwise their Roots will spread over each other, and thereby destroy themselves.

The third and fourth Sorts are very beautiful Plants, being worthy of a Place in every good Garden. These are somewhat tenderer than the former Sorts, tho' they will endure the Cold of our ordinary *Winters*, if planted in a light Soil, and a warm Situation. These may be propagated by sowing their Seeds in the Spring upon a Bed of fresh Earth; and when the Plants are come up, they should be transplanted into Beds of fresh Earth, at about six Inches Distance from each other, observing to water and shade them until they have taken Root, after which they will require no farther Care but to keep them clear from Weeds, and in very dry Weather to refresh them with Water.

At *Michaelmas* some of them may be transplanted into the Middle of warm Borders in the Pleasure-Garden, and the rest may be planted into Pots fill'd with light, fresh Earth, which in *Winter* should be shelter'd under a common Hot-bed Frame, where they may be cover'd in frosty Weather, but in mild Weather they should have as much free Air as possible: These Plants thus shelter'd, will flower very strong in *April*, and if duly water'd in dry Weather, will produce ripe Seeds in *July*, which may be gather'd in the Pods, and preserv'd for Use. The Roots of these Plants will abide three or four Years, unless destroy'd

by great Cold, and may be parted to increase them: But these Plants which are propagated from Slips do seldom flower so strong as those produc'd from Seeds, so that it is the best Way to raise every Year some from Seeds to succeed the old Roots.

The fifth, sixth, seventh and eighth Sorts are also tender, and will rarely endure the Cold of our *Winters* without Shelter, unless in some very warm Situations; therefore these should be planted in Pots fill'd with fresh, light Earth, and shelter'd in *Winter* as the two former Sorts. These may be propagated either from Seeds, as the former, or from Cuttings; but the former being the best Way, is generally practis'd, because the Plants rais'd from Seeds do always flower much stronger than those produc'd from Cuttings, and likewise grow more regular. These Sorts will abide two or three Years, if defended from Frost in *Winter*, but if they should continue longer, they are seldom so beautiful as young Plants, so that they should be often renew'd from Seeds.

SCRUPOSE; full of Gravel-stones.

SECALE; [so call'd of *Secare*, Lat. to cut, because these Plants are cut when the Seeds are ripe.] Ric.

The Characters are;

The Flowers have no Leaves, but consist of several Stamina, which are produc'd from the Flower-cup: These Flowers are collected into a flat Spike, and are dispos'd almost singly; from the Flower-cup rises the Pointal, which afterwards becomes an oblong slender Seed inclos'd in a Husk which was before the Flower-cup. This differs from Wheat, in having a flatter Spike, the Awn larger and more naked.

The Species are;

1. SECALE; *hybernum*, vel *majus*. C. B. P. Common or Winter Ric.

2. SECALE; *vernum* & *minus*. C. B. P. Lesser or Spring Ric.

These are all the Sorts of Ric which are at present known in *England*. The Manner of sowing and husbanding these Plants being so well known to every Farmer, it would be needless to say any thing of it in this Place, more than that the first must be sown in *Autumn*, as *Wheat*; but the other may be sown in the *Spring*, at the Season for *Barley*, and will ripen almost as soon as that which was sown in *Autumn*; which is a great Advantage in such Countries, where it is subject to be destroy'd in *Winter*.

SECURIDACA; so call'd of *Securis*, Lat. a Hatchet, because the Ancients fancied the Seeds of it resembled an Hatchet.] Hatchet-Vetch.

The Characters are;

It hath a papilionaceous Flower, out of whose Empalement rises the Pointal, which afterwards becomes an upright, plain, annual articulated Pod, containing in each Joint a Rhomboid Seed, having a Notch on the inner Side.

We have but one Species of this Plant in *England*, viz.

SECURIDACA; *lutea major*. C. B. P. The greater Yellow Hatchet Vetch.

This Plant grows amongst the Corn in *Spain*, *Italy*, and other warm Countries; but in *England* it is preserv'd in Botanick Gardens for the Sake of Variety. This may be propagated by sowing the Seeds in Borders of light fresh Earth in the *Spring*, in the Places where they are to abide; for they seldom succeed well if they are transplanted: They should be allow'd at least two Feet Distance, because their Branches trail upon the Ground: In *June* these Plants will flower, and in *August* their Seeds will ripen, when they should be gather'd, and preserv'd for Use. A few of these Plants may be admitted into every good Garden for Variety, tho' there is no great Beauty in their Flowers.

SEDUM; [so call'd of *Sedendo*, Lat. *sitting*, because this Plant does, as it were, sit upon the Walls where it grows; or of *Sedando*, *appeasing*, because it appeases the Pains of Inflammations.] Houseleek.

The Characters are;

The Flower consists of several Leaves, which are plac'd orbicularly, and expand in form of a Rose; out of whose Flower-cup rises the Pointal, which afterwards turns to a Fruit, compos'd, as it were, of many Seed-vessels, resembling Husks, which are collected into a Sort of Head, and full of small Seeds.

The Species are;

1. **SEDUM**; *majus, vulgare*. C. B. P. Common great Houseleek.

2. **SEDUM**; *minus, luteum, folio acuto*. C. B. P. The most ordinary Prickmadam, or sharp-pointed Yellow Houseleek.

3. **SEDUM**; *minus, luteum, ramulis reflexis*. C. B. P. Yellow Stonecrop, with reflected Flowers.

4. **SEDUM**; *parvum acre flore luteo*. J. B. Wall Pepper, or Stonecrop.

5. **SEDUM**; *minus, à rupe Sancti Vincentii*. Raii Syn. Stonecrop of St. Vincent's Rock.

6. **SEDUM**; *minus, teretifolium album*. C. B. P. White flower'd Stonecrop, with round-pointed Leaves.

7. **SEDUM**; *minus, circinato folio*. C. B. P. Lesser Stonecrop, with round Leaves.

8. **SEDUM**; *majus, vulgari simile, globulis decidentibus*. Mor. Hist. Houseleek, like the common Sort, throwing off the young ones.

9. **SEDUM**; *montanum, tomentosum*. C. B. P. Mountain woolly Houseleek, commonly call'd, Cobweb Houseleek.

10. **SEDUM**; *majus arborescens*. J. B. Greater Tree Houseleek.

11. **SEDUM**; *majus arborescens, foliis elegantissimè variegatis tricoloribus*. Boerb. Ind. Greater Tree Houseleek, with beautiful variegated Leaves.

12. **SEDUM**; *Canarium, foliis omnium maximis*. H. A. The greatest Houseleek of the Canaries.

13. **SEDUM**; *Afrum, saxatile, foliolis sedi vulgaris, in rosam vere compositis*. Boerb. Ind. African Rock Houseleek, with small Leaves, like the common Sort, collected like a Rose.

14. **SEDUM**; *Afrum, montanum, foliis subrotundis, dentibus albis serratis, confertim natis*. Boerb. Ind. African Mountain Houseleek, with roundish, indented, serrated Leaves, with white Edges.

15. **SEDUM**; *Africanum, frutescens, folio longo serrato, confertim nato*. Boerb. Ind. African Shrubby Houseleek, with long serrated Leaves.

The first Sort is very common in *England*, being often planted upon the Tops of Houses, and other Buildings, where being preserv'd dry, it will endure the greatest Cold of our Climate. This is directed by the College of Physicians to be us'd in Medicine as a great Cooler. It may be propagated by planting the Off-sets (which are produc'd in great Plenty from the old Plants) any time in *Summer*. It requires to be plac'd very dry; for if its Roots are moist, the Plants will rot in cold Weather.

The second, third, fourth, sixth, and seventh Sorts grow in Plenty upon Walls and Buildings in divers Parts of *England*, where they propagate themselves by their trailing Branches, so as in a short time to cover the whole Place, provided they are not cut off. The sixth Sort is also prescrib'd by the College of Physicians to enter some officinal Compositions; but the People who supply the Markets, do commonly sell the Wall Pepper instead of this; which is a very wrong Practice, because the sixth Sort is a very cold Herb, and is accordingly directed to be put into cooling Ointments; and the Wall Pepper is an exceeding sharp acrid Plant, (from whence it receiv'd the Name of Wall Pepper) which renders it contrary to the Intention of the Physician; therefore whoever makes use of these Plants, should be very careful to have the right, otherwise it is better to use the common great Sort, in which they are not so liable to be impos'd on.

The fifth Sort is a Native of *St. Vincent's Rock* in *Cornwall*, from whence it hath been taken, and distributed into the several Gardens of such Persons as are curious in preserving a Variety of Plants.

These Plants are all extreme hardy, and will thrive exceedingly, if planted in a dry Soil, and an open Situation, where they will propagate themselves by their trailing Branches, which take Root where-ever they touch the Ground.

The eighth and ninth Sorts do propagate themselves by Off-sets, in the manner as the common Sort, though the eighth throws off the young ones from the Top of the old Plants, which, falling on the Ground, take Root, and thereby are increas'd very plentifully. These are both very hardy, and if planted in a dry rubbishy Soil will thrive, and endure the severest Cold of our Climate.

The tenth Sort is propagated by planting Cuttings during any of the *Summer* Months, which should be laid in a dry Place a Fortnight after they are cut from the old Plants, that their wounded Parts may heal over before they are planted, otherwise they are subject

to rot. These should be planted in Pots fill'd with light, fresh, sandy Earth, and plac'd in a shady Situation, (but not under the Drip of Trees) observing to give 'em now and then a little Water, when the Earth is dry; but you must be very careful not to let them have too much Moisture, which will rot 'em.

When they have taken Root, they may be remov'd into a more open Situation, placing 'em amongst other Exotick Plants, in a Place where they may be defended from strong Winds; in which Situation they may remain until *Autumn*, when they must be remov'd into the Conservatory, to be preserv'd from Cold in Winter, which will destroy 'em. Tho' they do not require any artificial Heat, but only to be protected from Frost, yet do they require to have as much free Air as possible in mild Weather; therefore the best Way of preserving these Plants, is to have an airy Glass-case, in which many Sorts of *Ficoides's*, and other succulent Plants, may be intermix'd with these, where they will thrive much better than if placed amongst *Oranges*, *Myrtles*, and other Trees in a Green-house; because the Perspiration of those Trees renders the Air of the Place damp, and when the House is closely shut up, this Air is often rancid, which being imbib'd by the *Houfseleeks*, will cause their Leaves to fall off, and the Plants will decay soon after; whereas in an open airy Glass-case, where there is none but succulent Plants, there will never be near so much damp in the Air, and in such Places they will thrive and flower almost every *Winter*, when the Plants have gotten sufficient Strength. These Plants in moist Weather will send forth long Roots from their Branches, four or five Feet from the Ground, and if the Earth is plac'd near to these Roots, they will strike into it, and the Branches may be afterwards separated from the old Plants.

The eleventh Sort is a Variety of the tenth, which was accidentally obtain'd in the Gardens of the late Dutchess of Beaufort at Badmington, from a Branch which broke off from one of the plain Sort of *Houfseleek* Trees by accident, and being planted in Lime Rubbish afterwards, became beautifully variegated; from which Plant there hath been vast Numbers rais'd, and distributed into many curious Gardens, both at Home and Abroad. This is propagated in the same manner as the former, and requires the same Management in *Winter*; but the Soil in which it is planted should be one half fresh sandy Soil, and the other half Lime Rubbish and Sea Sand, equally mix'd, in which it will thrive much better than in a rich Soil: You must also be very careful not to give it too much Water in *Winter*, which will cause it to cast its Leaves and decay. With this Management these Plants will grow to be eight or ten Feet high, and will produce beautiful Spikes of Flowers every Year, which are commonly in Beauty in *Winter*, and are thereby more valuable for coming at a Season when few other Plants do flower. Sometimes these Plants will produce ripe Seeds, which, if permitted to fall upon the Earth of the

Pots, will come up the *Summer* following, from whence a great Stock of the Plants may be produc'd; tho' as they do so easily take Root from Cuttings, there will be no occasion to propagate them any other Way.

The twelfth Sort seldom produces any Side Branches, but grows up to one single large Head, with very large Leaves. This is only propagated from Seeds, for when the Plants produce their Flowers, they always decay so soon as the Seed is ripe; therefore the Seed should either be sown in Pots fill'd with light, sandy Earth as soon as it is ripe, or permitted to shed upon the Pots where they grew; which must be shelter'd from the Frost in *Winter*, and the *Spring* following the young Plants will come up in Plenty; when they should be transplanted into Pots fill'd with fresh, light Earth, and expos'd in *Summer* with other Exotick Plants, in some well-shelter'd Situation, where they may remain until *October*, when they should be hous'd with the foregoing Sorts, and manag'd in the same manner as hath been directed for them. These Plants will flower in four or five Years from Seed, provided they are well manag'd, after which (as was before said) they usually decay, therefore it is necessary to have a Succession of young Plants, that there may be annually some to flower.

The thirteenth and fourteenth Sorts are of smaller Growth: These do rarely rise above six Inches high, but send forth a great Quantity of Heads from their Sides, which if taken off and planted in fresh, light, sandy Earth, will take Root, and make fresh Plants, which may be preserv'd in Pots, and hous'd in *Winter* with the other Sorts before mention'd, and require to be treated in the same Way.

The fifteenth Sort grows to be shrubby, and may be propagated by planting the Cuttings in the manner directed for the Tree *Houfseleek*, and must also be hous'd in *Winter*, and treated in the same manner as hath been already directed for that Sort.

These are all of them very ornamental Plants in the Green-house, and add greatly to the Variety, when plac'd amongst other curious Exotick Plants.

SEED. The Seed of a Plant consists of an Embryo, with its Coat or Cover. The Embryo, which contains the whole Plant in Miniature, and which is called the Gem or Bud, is rooted in the *Placenta* or *Cotyledon*, which makes the Coat or *Involucrum*, and serves the same Purposes as the *Secundines*, i. e. the *Chorion* and *Amnion* in Animals.

The *Placenta* or *Cotyledon* of a Plant is always double; and in the Middle and common Centre of the two is a Point or Speck, which is the Embryo or Plantule. This Plantule being acted on and mov'd by the Warmth of the Sun and the Earth, begins to expand, and protrudes or shoots out its *Radicle* or Root both upward and downward. By this it absorbs the nutritious Juice from the Earth, and so grows and increases, and the requisite Heat continuing, the Growth continues.

Thus,

Thus, *e. g.* a *Pea* or *Bean* being committed to the Ground, is first found to cleave into two Parts, which are, as it were, two Leaves or Lobes of the *Placenta*, and in the Fissure appears a Point, which shoots out a Root downwards, and a Bud upwards; the first spreading itself in the Soil to catch the Moisture thereof; and the latter mounting into the Air, and becoming the Stem or Body of the new Plant.

It is very remarkable, how the *Plumule* or future Stem should always get uppermost, and the *Radicle* or Root be turn'd downwards, and this too perpendicularly to the Horizon: And not only this, but if by any external Means the Stem be diverted from this Perpendicular, and bent, for Instance, towards the Earth, instead of persevering in that Direction, it makes an Angle or Elbow, and redresses itself.

The same is observ'd in Trees, &c. blown down with their Roots by the Wind; or in those planted in Pots, upon turning the Pot on one Side.

Now the *Seed* from which a Plant arises, being the Plant itself in Miniature, 'tis easy to suppose, that, if it be deposited in the Ground with the *Plumule* perpendicularly upward, and the *Radicle* downward, the Disposition should be maintain'd in its future Growth.

But it is known, that *Seeds* sown either of themselves, or by the Help of Man, fall at Random, or among an infinite Number of Situations of the *Plumule*, &c. the perpendicular one upwards is but one; so that in all the rest, 'tis necessary the Stem and Root do each make a Bend to be able the one to emerge directly upwards, the other downwards. Now what Force is it that effects this Change, which is certainly an Action of Violence?

M. *Dodart*, who first took Notice of the *Phænomenon*, accounts for it by supposing the Fibres of the Stem of such a Nature, as to contract and shorten by the Heat of the Sun, and lengthen by the Moisture of the Earth; and on the contrary, the Fibres of the Root to contract by the Moisture of the Earth, and lengthen by the Heat of the Sun.

On this Principle, when the *Plantule* is inverted, and the Root a-top, the Fibres of the Root being unequally expos'd to the Moisture, *viz.* the lower Parts more than the upper, the lower will contract; and this Contraction be promoted by the lengthening of the upper from the Action of the Sun. The Consequence whereof will be, the Roots recoiling, insinuating farther into the Earth, and getting beneath the Body of the Seed.

In a Word, the Earth draws the Root toward itself, and the Sun promotes its Descent; on the contrary, the Sun draws up the Plume, and the Earth, in some measure, sends it towards the same.

M. *De la Hire* accounts for the same Perpendicularity, by only conceiving the Root to draw a coarser and heavier Juice; and the Stem a finer and more volatile one: In the *Plantule* therefore we may conceive a Point of Separation; such as that all on one

Side, *e. g.* the radial Part is unfolded by the grosser, and all on the other by more subtiler Juices.

If the *Plantule* then be inverted, and the Root a-top, as it still imbibes the grosser and heavier Juices, and the Stem the lighter; the Point of Separation being conceiv'd as the fix'd Point of a Lever, the Root must descend, and at the same time that the volatile Juices imbibed by the Stem, tend to make it mount. Thus is the little Plant turn'd on its fix'd Point of Separation, till it be perfectly erect.

The Plant thus erected, M. *Parent* accounts for the Stem's continuing to rise in the virtual Direction, thus: The nutritious Juice being arriv'd at the Extremity of a rising Stalk, and there fixing into a vegetable Substance, the Weight of the Atmosphere must determine it to fix in a virtual Position; so that the Stalk will have acquir'd a new Part of Perpendicularity over the rest; just as in a Candle, which held any how obliquely to the Horizon, the Flame will still continue vertical by the Pressure of the Air.

The new Drops of Juice that succeed, will follow the same Direction; and as all together form the Stem, that must of Course be vertical, unless some particular Circumstance intervene.

And, that whereas the Branches are likewise observ'd, as much as possible, to affect Perpendicularity; insomuch, that tho' they be forc'd to shoot out of the Stem horizontally, yet in their Progress they erect themselves: M. *Parent* solves this from the vertical Tendency of the nutritious Juice up the Stem; for the Juice being receiv'd in this Direction into the new tender Bud, finds, at first, little Resistance; and afterwards, as the Branch grows firmer, it furnishes a longer Arm of a Lever to act by.

Mr. *Arrue* accounts for the perpendicular Ascent of the Stems, and their reerecting themselves when bent, on these two Principles.

1. That the nutritious Juice arises from the Root to the Top in longitudinal Tubes, parallel to the Side of the Plant, which communicate either by themselves, or by means of other horizontal Tubes, proceeding from the Circumference of the Plant, and terminated in the Pith.

2. That Fluids contain'd in Tubes, either parallel or oblique to the Horizon, gravitate on the lower Part of the Tubes, and not all on the upper.

From hence it easily follows, that in a Plant, posited either obliquely or parallel to the Horizon, the nutritious Juice will act more on the lower Part of the Canals than the upper; and by that means insinuate more into the Canals communicating therewith, and be collected more copiously therein: Thus the Parts on the lower Side will act more on the lower Part, and will receive more Accretion, and be more nourish'd than those on the upper: The Consequence whereof must be, that the Extremity of the Plant will be oblig'd to bend upward.

The same Principle brings the *Seed* into its due Situation at first; In a *Bean* planted upside down, the Plume and Radicle are easily perceiv'd,

ceiv'd, with the naked Eye, to shoot at first directly for about an Inch; but thenceforth they begin to bend, the one downward, and the other upward.

The two *Placentulae* or *Cotyledones* of a *Seed* are, as it were, a Case to this little tender *Plantule* or Point, covering it up, sheltering it from Injuries, and feeding it from their own proper Substance, which the *Plantule* receives and draws to itself, by an infinite Number of little Filaments or Ramifications, called *Funes Umbilicales* or Navel-strings, which it sends into the Body of the *Placenta*.

Now when the *Seed* is committed to the Earth, the *Placenta* still adheres to the *Embryo* for some time, guards it from the Access of noxious Colds, &c. and even prepares and purifies the cruder Juice the Plant is to receive from the Earth, by straining it, &c. through its own Body.

This it continues to do, till the *Placentula* being a little enur'd to its new Element, and its Root tolerably fix'd in the Ground, and fit to absorb the Juice thereof, it then perishes, and the Plant may be said to be deliver'd: So that Nature observes the same Method in Plants, contain'd in Fruits, as in Animals in the Mother's Womb.

It is very surprizing how many Sorts of *Seeds* will continue good for several Years, and retain their growing Faculty; whereas, many other Sorts will not grow when they are more than one Year old, which is in a great measure owing to their abounding more or less with Oil, and the Texture of their outward Covering. As for Example, the *Seeds* of Cucumbers, Melons and Gourds, which have thick, horny Coverings, do continue good eight or ten Years; and *Radish*, *Turnip*, *Rape*, &c. with other oily *Seeds* (whose Coats, tho' they are not so hard and close as the others) yet abounding with Oil, the *Seeds* will keep good three or four Years; whereas the *Seeds* of *Parsley*, *Carrots*, *Parasnisps*, and most other umbelliferous Plants, whose *Seeds*, are for the most part of a warm Nature, do lose their growing Faculty often in one Year, but do seldom remain good longer than two Years. But all Sorts of *Seeds* are preserv'd best if kept in the Pods or Husks wherein they grew; so that whoever would send *Seeds* to a distant Country, should always take Care they are full ripe before they are gather'd, and that they are preserv'd in their Pods or Husks, and not shut up too closely from the Air, which is absolutely necessary to maintain the Principle of Vegetation in the *Seed*, (tho' in a less degree) as to nourish the Plant when germinated; as I found by trying the following Experiment; viz. having saved a Parcel of fresh *Seeds* of several Kinds, as *Lettuce*, *Parsley*, *Onions*, &c. I took a Parcel of each Kind, and put into Glass Phials; these I stopp'd down close, and seal'd hermetically, then put them up in a Trunk: The other Parts of the same *Seeds* I put into Bags, and hung them up in a dry Room, where they remain'd a whole Year; and in the following Spring, I took out a Part of each Parcel of

Seeds from the Phials, as also from the Bags, and sowed them at the same time, and upon the same Bed, where they had an equal Advantage of Sun, Air, &c. The Consequence of this was, almost all the *Seeds* which I took out of the Bags grew extremely well; but those which were kept in the Phials did not one come up: After which, I sow'd the remaining Part of the *Seeds* in the Phials, but had not one single Plant from the Whole; whereas those preserv'd in the Bags grew very well both the second and third Years: And this Experiment was afterwards try'd by one of my particular Friends, with whom the Effect was the same as with me: So that those Persons who send *Seeds* to a distant Country, should never put them up in Glasses, as hath by some unskilful Persons been directed.

The Earth, which is the natural Nurse to all *Seeds*, will preserve them much longer than any other Body, provided they are buried so deep as to be beyond the Influence of Sun and Showers, whereby they are prevented from vegetating. I have known *Seeds* of several Plants remain bury'd three Feet deep above twenty Years, and when turn'd up to the Air, have grown as well as fresh *Seeds*; and a particular Friend of mine, shew'd me a Spot of Ground which was cover'd with *Corn-Sallet*, the *Seeds* of which he assur'd me had been bury'd thirty-two Years in that Place; and when turn'd up again to the Air, were as productive as new *Seeds*.

A Method for raising such Seeds which have hard Coats or Shells surrounding them, and that have been judg'd very difficult, if not impossible, to be rais'd in England.

In the Year 1724, I had a Parcel of fresh *Cocoa-Nuts* given me, which was brought over from *Barbadoes*: Part of these *Nuts* I divested of their outward Coat or Husk, and the other Part I left intire, as I receiv'd them.

Both these Parcels I planted in large Pots, fill'd with good fresh Earth, and plung'd the Pots into Hot-beds made of Tanner's-Bark, giving them gentle and frequent Waterings, as the Earth in the Pots seem'd to require, but had not one out of the whole Number made any Attempt to shoot, as I could perceive; and upon taking them out of the Pots, I found they were rotten.

About four Months after I receiv'd another fresh Parcel of *Cocoa-Nuts* from *Barbadoes*, which I treated in another manner: From part of these I cut off the Outer-Coat or Husk, and the other Part I left intire, as before: But supposing it was owing to my planting the other Parcel in Pots, that they did not succeed, I made a fresh Hot-bed (with Horse-dung) and cover'd it over with fresh Earth about eighteen Inches thick, in which I planted the *Nuts*; observing, as before, to supply it with convenient Moisture, as also to keep the Hot-bed in an equal Temper of Heat, which I was guided to do by a *Thermometer*, graduated for the Use of Hot-beds; but

but with all my Care I had no better Success than before, not one of the *Nuts* making any Effort towards shooting.

The Year following I had another Parcel of *Cocoa-Nuts* given me, which considering my former ill Success, I planted in a different manner, as follows.

Having a Hot-bed, which had been lately made with Tanner's Bark, and which was fill'd with Pots of *Exotick* Plants, I remov'd two of the largest Pots, which were plac'd in the Middle of the Bed; and opening the Tanner's-Bark under the Place where the two Pots stood, I plac'd the two *Cocoa-Nuts* therein, laying them side-ways to prevent the Moisture (which might descend from the Pots) from entering the Hole at the Base of the Fruit, and thereby rot the seminal Plant upon its first germinating.

I then cover'd the *Nuts* over with the Bark two or three Inches thick, and plac'd the two Pots over them in their former Station.

In this Place I let the *Nuts* remain for six Weeks; when removing the two Pots, and uncovering the *Nuts*, I found them both shot from the Hole in the Base of the Fruit an Inch in Length, and from the other End of the Fruit were several Fibres emitted two or three Inches in Length.

Upon finding them in such a Forwardness, I took them out of the Bark, and planted them in large Pots, fill'd with good fresh Earth; plunging the Pots down to the Rims in Tanner's-Bark, and covering the Surface of the Earth in the Pots half an Inch with the same; soon after which, the young Shoots were above two Inches long, and continu'd to thrive very well.

I communicated this Method to some of my Acquaintance, who have try'd it with the same Success, and if the *Nuts* are fresh, scarce any of them miscarry.

This led me to try, if the same Method would succeed as well with other hard-shell'd, *Exotick Seeds*; which I could not, by any Method I had before try'd, get to grow; as the *Bonduc* or *Nickar-tree*, the *Abrus* or *Wild Liquorice*; the *Phaseolus Brasiliensis*, *Lobis Villosis*, *Pungentibus Maximus Hermannii*, or *Horse-eye Bean*, with several others; and I have found it both a sure and expeditious Way to raise any Sort of hard-shell'd *Fruits* or *Seeds*.

For the Heat and Moisture (which are absolutely necessary to promote Vegetation) they here enjoy in an equal and regular Manner: The Tanner's-Bark (if rightly manag'd) keeping near an Equality of Heat for six Months, and the Water which descends from the Pots, when they are water'd, is by the Bark detain'd from being too soon dissipated; which cannot be obtain'd in a common Hot-bed, the Earth in such being work'd away by the Water, and thereby leaving the *Seeds* often destitute of Moisture.

Some of these *Seeds* I have had shoot in a Fortnight's time; which, I am inform'd, would not have so done in a Month in their natural Soil and Climate.

I have also found this to be an excellent Method to restore *Orange* (or any other *Exotick*) Trees, which have suffer'd by a tedious Passage, in being too long out of the Ground, insomuch, that I recover'd two *Orange-trees* which had been ten Months without either Earth or Water.

SEGMENT-LEAVES, are Leaves of Plants divided or cut into many Shreds.

A **SEMINARY** is a Seed-Plot, which is adapted or set apart for the sowing of Seeds. These are of different Natures and Magnitudes, according to the several Plants intended to be rais'd therein. If it be intended to raise Timber or Fruit-Trees, it must be proportionably large to the Quantity of Trees design'd, and the Soil should be carefully adapted to the various Sorts of Trees. Without such a Place as this, every Gentleman is obliged to buy at every Turn whatever Trees he may want to repair the Losses he may sustain in his Orchard, Wilderness, or larger Plantations; so that the Necessity of such a Spot of Ground will easily be perceiv'd by every one. But as I have already given Directions for the preparing the Soil, and sowing the Seeds in such a *Seminary*, under the Article of *Nursery*, I shall not repeat it in this Place, but refer the Reader to that Article.

It is also as necessary for the Support of a curious Flower-Garden, to have a Spot of Ground set apart for the sowing of all Sorts of Seeds of choice Flowers, in order to obtain new Varieties; which is the only Method to have a fine Collection of valuable Flowers; as also for the sowing of all Sorts of biennial Plants, to succeed those which decay in the Flower-Garden; so that the Borders may be annually replenish'd, which without such a *Seminary* could not be so well done.

This *Seminary* should be situated at some Distance from the House, and be intirely inclos'd either with a Hedge, Wall, or Pale, and kept under Lock and Key, that all Vermin may be kept out, and that it may not be expos'd to all Comers and Goers, who many times do Mischief before they are aware of it. As to the Situation, Soil, and Manner of preparing the Ground, it has been already mention'd under the Article of *Nursery*, and the particular Account of raising each Sort of Plant being directed under their proper Heads, it would be needless to repeat it here.

SEMIFISTULAR FLOWERS, are such whose upper Part resembles a Pipe, cut off obliquely, as in *Aristolachia* or *Birib-wort*.

SEMINAL LEAVES, are two plain, soft and undivided Leaves, that first shoot forth from the greatest Part of all sown Seeds; which Leaves are very different from those of the succeeding Plant in Size, Figure, Surface, and Position.

SEMINIFEROUS; bearing or producing Seed.

SENECIO;

SENECIO; [so call'd of *Senescere*, Lat. to wax old, because in a hot Climate or Weather it soon flourishes, and grows old, and the Seed afterwards represents the Heads of old Men. It is also called *Erigeron*, of *ἔρα* in the Spring, and *ῥέγω*, to wax old, q. d. the old Man of the Spring, because it flourishes in Winter, and so becomes old in the Spring. It is also called *Herba Pappa*, because its Seeds are very downy.] Groundsel.

The Characters are;

It hath a flosculous Flower, consisting of many Florets, divided into several Segments, sitting on the Embryo, contain'd in an Empalement, consisting of one Leaf, and divided into many Parts, afterwards becoming of a conical Figure: the Embryo afterwards becomes a Seed, furnish'd with Down; at which time, the Empalement is reflex'd to make way for the Seeds to escape.

The Species are;

1. **SENECIO**; *minor, vulgaris. C. B. P.* Common Groundsel.

2. **SENECIO**; *Africanus, arborescens, folio ferrato. Boerb. Ind.* African Tree-like Groundsel, with a ferrated Leaf.

3. **SENECIO**; *Virginianus, arborescens, atriplicis folio. Par. Bat.* Virginian Groundsel-Tree, with an Orach Leaf.

4. **SENECIO**; *Africanus, arborescens, folio ficoidis. Com. Prel.* African Groundsel-Tree, with a Ficoides Leaf.

The first Sort here mention'd is one of the most common Weeds upon Dunghills, old Walls, and Gardens, that we have in England; so that instead of cultivating it, it requires some Pains to destroy it in Gardens: for if it be suffer'd to seed in a Garden, (which it soon will do if permitted to stand, it will be very difficult to extirpate it. This is sometimes us'd in Medicine, but its chief Use in England is to feed Birds.

The second Sort grows to a Shrub of seven or eight Feet high, and produces its Flowers, in Summer and Autumn, at the Extremity of the Branches, in Bunches; which tho' of no great Beauty, yet serves to add to the Variety of Exotick Plants in the Green-house. This Plant may be propagated by planting the Cuttings, during any of the Summer Months, in a Bed of fresh, rich Earth, observing to water and shade them until they have taken Root, after which they will require no farther Care but to keep them clear from Weeds until August, when they should be taken up carefully, and planted into Pots fill'd with light rich Earth, and plac'd in a shady Situation until they have taken Root; after which they may be remov'd to a more open Situation, where they may remain till the latter End of October; when they should be remov'd into the Green-house, placing them in the coldest Part thereof, for they only require to be shelter'd from severe Frost, and must have as much free Air as possible in mild Weather; and be after refresh'd with Water: In Summer they may be expos'd with Myrtles, Oleanders, and other hardy Exotick Plants, where they will add to the Variety.

The third Sort doth grow to be a large woody Shrub, about ten or twelve Feet high, but is hardly to be train'd up into a regular Figure, for the Branches are produced so irregularly, that it makes but an indifferent Figure in a Garden; but being a hardy Shrub, it is often preserved by such as are curious in collecting the various Sorts of hardy Plants.

This may be propagated by planting Cuttings, taken from the tender Wood, in the Spring of the Year, observing to water and shade them until they have taken Root; after which they must be carefully kept clear from Weeds, which is all the Management they will require until the succeeding Spring, when they should be transplanted either into the Places where they are designed to grow, or into a Nursery, where they may be trained up another Season; though it is the best Way to plant them where they are to remain, when they are taken from the Bed where they were raised, because these Plants are with Danger removed when they are grown very woody.

The best Time to remove them is in the Beginning of April, just before they shoot; and they should be placed in a light Soil and a warm Situation, where they will endure the Cold of our ordinary Winters without any Shelter, but in very sharp Winters they are sometimes destroy'd. This Shrub produces its Flowers in October, which altho' not very beautiful, yet are esteem'd by some for their coming so late in the Season.

The fourth Sort is a very beautiful succulent Plant; the Leaves, which are long, thick, and juicy, are cover'd over with a glaucous Flew, somewhat like Plums, and these being broken, do emit a strong Turpentine Odour, which has occasioned some ignorant Persons to give it the Name of *Balsam-Tree*.

This Plant is easily propagated by planting Cuttings of it during any of the Summer Months, (which should be taken from the old Plants at least a Fortnight before they are planted, and laid in a dry Place for their Wounds to heal over, otherwise they will be subject to rot) then planted in Pots of light, sandy Earth, and placed in a Situation where they may enjoy the Morning Sun, observing to refresh them with Water, gently, as the Earth in the Pots dries: In this Place they may remain for eight or ten Days, after which the Pots should be plunged into a moderate Hot-bed, which will greatly facilitate their taking Root: After they are rooted, they may be again expos'd to the open Air, placing them amongst *Ficoides*, *Sedums*, and other exotick succulent Plants, in a well-shelter'd Situation, where they may remain till the October following, when they should be removed into the Conservatory, placing them amongst the before-mentioned succulent Plants, in an airy Glass-case, where they may be defended from Frost, but should have as much free Air as possible in mild Weather; for if they are shut up too close in Winter, or have the Addition of any artificial Heat, the Leaves will decay and fall off, and the Plants will lose their

their Beauty; whereas if they are treated in a hardier Manner, and have the Advantage of a dry, free Air, they will appear extream beautiful, and flower throughout the *Winter*.

The Management of this Plant being nearly the same as most of the *Ficoides* do require, I shall not repeat any Part of that in this Place, but desire the Reader to turn back to that Article for any farther Directions.

SENNA, [so call'd of *Sana*, Lat. *healty*, because its Leaves restore Health.

The Characters are;

The Flower for the most part consists of five Leaves, which are placed orbicularly, and do expand in Form of a Rose; the Pointal afterwards becomes a plain, incurved, bivalve Pod, which is full of Seeds, each being separated by a double, thin Membrane.

The Species are;

1. SENNA; *Italica*, *foliis obtusis*. C. B. P. Italian Senna with blunt-pointed Leaves.

2. SENNA; *Americana*, *Ligustri folio*. Plum. American Senna with a Privet Leaf.

3. SENNA; *Alexandrina*, *five foliis acutis*. C. B. P. Alexandrian Senna with sharp-pointed Leaves.

The two first Species are preserv'd in several curious Gardens in *England*; but the third Sort, which is that used in Medicine, is at present very rare in this Country.

These Plants may be propagated by sowing their Seeds upon a Hot-bed early in the *Spring*, and when the Plants are come up, they should be transplanted into small Pots, filled with light, fresh Earth, and plunged into a new Hot-bed, observing to water and shade them until they have taken Root; after which they should have Air admitted to them, by raising the Glasses in Proportion to the Warmth of the Season, and the Bed in which they are placed; you must also observe to refresh them with Water from time to time, as the Earth in the Pots shall require; and when the Roots of the Plants have filled the Pots, they should be shifted into other Pots a Size larger, observing to take off the Roots which are matted round the Outside of the Ball of Earth next the Pot, and then fill up the Pots with the same fresh Earth, and plunge them into the Hot-bed again, giving 'em Air and Water in Proportion to the Warmth of the Season and the Bed in which they are placed: In this manner they must be treated until *Autumn*, when they must be removed into the Stove, and plunged into the Bark-bed, where during the *Winter* Season, they must be carefully preserved, refreshing them with Water every three or four Days, according as the Earth in the Pots dries. This Stove should be kept above temperate Heat in *Winter*, otherwise the Plants will not live therein. The *Summer* following the two first Species will flower and produce Seed, but the third Sort doth seldom flower so young; however, in a few Years, if it be rightly manag'd, it will produce both Flowers and Seeds.

SENNA THE BLADDER; *vide* *Colutea*.

SENNA THE SCORPION; *vide* *Emerus*.

SENSIBLE PLANT; *vide* *Mimosa*.

SEPTEMBER: *Work to be done in the Kitchen-Garden.*

The Beginning of this Month you should transplant your *Cauliflower* Plants which were sown in *August*, putting them either upon old Cucumber or Melon-beds; or, if they are backward, upon Beds of new Dung, but you must not make these Beds too hot, for that would be very injurious to them.

You must now hoe and clean *Turnips*, *Spinach*, and *Carrots* from Weeds, which, if permitted to get above the Plants, will be very injurious to them; and as the Weather at this Season often proves moist, so if due Care be not taken to destroy the Weeds in time, it will greatly promote their Growth, especially if the Season proves mild.

In moist Weather you should transplant *Coleworts* for *Spring* Use, as also *Cabbage* Plants which were sown the Beginning of *August*.

Transplant *Endive* under warm Walls, Hedges, or Pales, to stand 'till *February* before it is blanched; and in dry Weather tie up such as is fit for Blanching at this Season.

Earth up the *Selery* which was planted in the Trenches in *August*, being careful to do it in dry Weather, as also that it be not earthed above the Hearts of the Plants, which will prevent their growing tall, and often occasion their rotting.

Gather in all Sorts of Seeds which are now ripe, which must always be done in dry Weather, and after having laid 'em to dry upon a Floor, they should be beaten out of their Husks, and laid by for Use.

The Beginning of this Month make Beds for *Mushrooms*; the Manner of doing this is directed under its proper Article.

You may the Beginning of this Month safely transplant most Sorts of perennial, aromatick Herbs, which will take Root again before the Frost comes on to prevent them.

Continue sowing small Herbs for Sallets, such as *Radish*, *Turnip*, *Mustard*, *Chervil*, *Cress*, &c. but at this Season they should have a warm Border, otherwise if there should happen any frosty Nights, it will cause the Herbs to turn out of the Gound, and thereby be destroyed.

Draw the Earth up about *Chardoons*, in order to blanch 'em, but this should be done in dry Weather.

Towards the latter End of this Month you should transplant *Lettuces* of several Sorts into warm Borders, where they may remain to cabbage early in the *Spring*; but you may plant them pretty close at this Season, because if they all live through the *Winter*, Part of them may be transplanted out in the *Spring*, into an open Spot of Ground, where they will be larger than those left in the Border, but will come three Weeks later.

Toward

Toward the End of this Month you may cut down the withered Haulm of *Asparagus*, and cleanse the Weeds off from the Beds, burying them in the Alleys, as hath been directed under the Article of *Asparagus*.

At the End of this Month you may plant *Beans* and sow *Peas* in warm Situations, where, if they abide the *Winter*, they will come early the succeeding Year.

Products of the Kitchen-Garden in September.

Cabbage Lettuces of several Sorts, *Garden Beans* which were planted in May, *Kidney Beans*, *Rouncival* and *Marrowfat Peas*, *Melons*, *Cucumbers* for Pickling, *Mushrooms*, *Artichokes*, *Cabbages*, *Savoy*, and *Sprouts*, *Carrots*, *Parsnips*, *Turnips*, *Radishes*, *Onions*, *Garlick*, *Leeks*, *Rocamboles*, *Schalots*, *Potatoes*, *Scorzonera*, *Skirrets*, *Beets*, *Salsify*, and all Sorts of young *Sallet Herbs*.

Work to be done in the Fruit-Garden.

Gather such Fruits as are now ripe, which may be known by their easily quitting the Tree when they are turned up, for if they adhere closely to the Tree, it is a certain Sign that they are not fit to gather: The Fruits now ripe seldom continue good long, therefore it is best to gather them as they ripen.

The latter Part of this Month you may safely transplant all Sorts of early Fruit-trees, although their Leaves have not yet fallen, such as *Cherries*, *Nectarines*, *Peaches*, and all *Summer Pears* and *Apples*; you may also begin to prune *Cherries*, *Peaches*, *Nectarines*, and *Grapes*, at the End of this Month.

Transplant *Strawberries*, *Raspberries*, *Gooseberries*, and *Currants* toward the End of this Month, if the Weather proves moist, otherwise it will be better to defer it until the next.

Fruits in Prime and yet lasting.

Peaches. *Late Admirable*, *Portugal*, *Purple Alberge*, *Old Newington*, *Teton de Venus*, *Pavy Royal*, *Monstrous Pavy of Pomponne*, *Catherine*, *Rumbullion*, *Malacoton*.

Plums. *White Pear Plum*, *Mogul*, and *Imperatrice*.

Pears. *Autumn Bergamot*, *Swift Bergamot*, *Beurre Rouge*, the *Doyenné*, *Autumn Mouille Bouche*, and *Poir de Prince*.

Grapes. The *Chasselas*, *White Muscadine*, *Black Morillon*, *Parfly-leav'd*, *Black Grizly* and *White Frontinias*, *Warner's Red Hamborough*, *St. Peter*, *Mulmsey*, &c.

Several Sorts of *Figs*, *Currants*, *Raspberries*, *Gooseberries*, &c.

Apples. *Embroidered*, *Pearmain*, *Red Calvil*, *White Calvil*, *Compendu*, *Aromatick Pippen*, *Golden Rennet*, &c.

And in the Stove, the *Ananas*, or *Pine-Apple*.

Work to be done in the Flower-Garden.

Plant early *Tulips* in warm Borders, where

they will flower in *March*, or sometimes sooner if the *Winter* proves favourable.

Toward the latter End of this Month plant your *Anemone* Roots, which will cause them to flower early, and the Roots will make a greater Increase, provided they are not injur'd by Frost.

Dig the Borders of the Flower-Garden, and if they require it, add some new Earth, or very rotten Dung to them, and plant therein all Sorts of hardy, bulbous, and fibrous rooted Flowers; such as *Hyacinths*, *Daffodils*, *Jonquils*, *Muscary*, *Crocus's*, &c.

This is the best Season for Planting choice double *Hyacinths*; for if they are kept longer out of the Ground, they are apt to decay; but in Planting of these Roots, you must be careful to place 'em at least four or five Inches below the Surface of the Beds, which will secure them from Frost.

You may, toward the latter End of the Month, plant your choice *Ranunculus* Roots, observing always to do this in showery Weather, for Reasons already given under that Article.

Your Layers of *Carnations*, *Pinks*, *Sweet-Williams*, &c. which are not yet transplanted, should be now no longer deferr'd, because if they are not transplanted in this Month, they will not have Time to root before the Frost comes on, which will prevent their rooting.

Box Edgings may be now renewed, and those which are grown too thick may be now taken up and parted.

Slip and plant *Polyanthus's*, *Primroses*, *London-Pride*, *Thrift*, and such other fibrous-rooted Plants, which are propagated by parting their Roots. Cut down the Stems of such Flowers as are decay'd, and if you do not transplant them, dig the Ground about them, and add some fresh Compost thereto, which will greatly strengthen their Roots.

You may yet sow the Seeds of *Iris's*, *Tulips*, *Crown Imperials*, *Ranunculus's*, *Anemonies*, and other bulbous and tuberous rooted Flowers, though it were better if done in *August*; and towards the latter End of this Month, the Cases or Pots in which these Seeds are sown, shall be removed where they may enjoy the Benefit of the Sun, in which Place they should remain until Spring.

Auricula and *Polyanthus* Seeds may be sown in Pots or Cases of light rich Earth, being very careful not to bury them too deep, which often causes them to lie in the Ground 'till the second Spring, before the Plants come up.

Plants now in Flower in the Pleasure-Garden.

Asters of several Sorts, *Golden Rods* three or four Varieties, *Amaranthus's*, *Sun Flowers*, *Double Sowewort*, *Double Camomil*, *Double Parnassia* or *Sneezwort*, *Stock-Gilliflowers*, *African* and *French Marygolds*, *China Pinks*, *Marvel of Peru*, *Balsamines*, *Larkspurs*, *Scabious's*, *Sweet Sultan's*, *Lavatera's*, *Hollyhocks*, *Corysanthemum's*, *Cassiums*, *Colchicums*, *Saffron*, *Autumnal Crocus's*, *Cyclamens*, *Autumnal Hyacinth*, *Phalangiums*, *Tree Primrose*, *Polyanthus's*, *Auricula's*, *Snap Dragon*, *Venus Looking-glass*,

ing glass, *Lychnis's*, *Campanula's*, *Gentianella*, *Autumnalis*, *Scarlet Beans*, *Perficaria*, *Stramoniums*, *Amarantoides*, *Eternal Flowers*, with some others.

Hardy Trees and Shrubs now in Flower.

Jasmines, *Montbly Rose*, *Musk Rose*, *Arbutus*, *Passion Flower*, *Pomegranate*, *St. Peters wort*, *Shrub Cinquefoil*, *Mallow Tree*, *Althæa Frutex*, *Ketmia's*, *Laurustinus*, *Cedar of Libanus*, *Alaternus*, *Phillyrea*, with some others.

Work to be done in the Green-house and Stove.

Toward the latter End of this Month you should remove your *Orange* and *Lemon Trees* into the *Green-house*, observing always to do it in a dry Day, when the Leaves have no Moisture upon 'em; and place 'em thinly in the House until the other more hardy Plants are brought in, which many times need not be done till the End of *October*, according as the Frost keeps out, during which Time your *Oranges* should have as much free Air as possible.

You should also at this Time remove your *Sedums*, *Cotyledons*, *Ficoides's*, and other succulent, exotick Plants into the *Conservatory*; but you must open the Glasses every Day, while the Weather continues mild, for if they are confin'd too close at this Season, their Leaves will grow pale, and fall off, so that the Plants will not appear beautiful 'till the following *Summer*.

This is also the Time to renew the *Tanner's Bark* in the *Stoves*, and place all the most tender Exoticks therein for their *Winter* Standing, being careful, if the Bark should heat too violently, not to plunge the Pots too deep therein.

If any of your *Cercus's*, *Euphorbiums*, *Aloes*, and other tender succulent Plants have been removed out of the dry Stove, they should now be carried in again, lest Morning Frosts should come suddenly upon 'em, which would greatly injure them.

All the tender Exotick Trees, Shrubs, and Plants, which have been removed out in the *Summer*, should also be now placed into the Stove, because the Nights beginning to grow cold, will prejudice them.

Plants now in Flower in the Green-house and Stove.

Oleanders double and single, *Colutea Æthiopica*, *Amomum Plinii*, *Myrtles*, *Tree Candy Tuft*, *Scabious Tree*, *Ficoides's*, *Sedums*, *Aloes*, *Tub. malus's*, *Spanish*, *Yellow Indian*, *Azorian*, *Ilex-leav'd* and *Arabian Jasmines*, *Tuberose Hyacinth*, *Double Nasturtium*, *Guernsey Lily*, *Belladonna Lily*, *Leonurus*, *Geraniums*, *Cotyledons*, *Capers*, *Amber Tree*, *Citissus Incanus*, *Heliotropium Arborescens*, *Cistus's*, *Granadilla's*, *Sensitive* and *Humble Plants*, *White Jamaica Narcissus*, *Papaw Tree*, *Apocynums*, *Fritillaria Crassa*, *Indian Figs*, *Viburnums*, *Canna Indica*, *Bean Capers*, *Indian Arrow-Root*, *African Aloe's*, *African Groundfel Tree*, *Indigo*,

French Physick-Nut, *Palma Christi*, with some others.

SEPTIFOLIOUS PLANTS, are such as have just seven Leaves.

SERPILLUM, [so call'd of *serpere*, Lat. to creep, because while it is growing it creeps so as to over-run whole Mountains.] Mother of Thyme.

The Characters are;

It hath trailing Branches, which are not so woody and hard as those of Thyme, but in every other respect is the same.

The Species are;

1. SERPYLLUM; *vulgare majus*, flore purpureo. C. B. P. Greater common Mother of Thyme with a purple Flower.

2. SERPYLLUM; *vulgare minus*. C. B. P. Common smaller Mother of Thyme.

3. SERPYLLUM; *vulgare*, flore amplo. Raii. Syn. Common Mother of Thyme with a large Flower.

4. SERPYLLUM; *citratum*. Ger. Emac. Lemon Thyme.

5. SERPYLLUM; *odore juglandis*. J. B. Mother of Thyme smelling like Walnuts.

6. SERPYLLUM; *vulgare*, hirsutum. Raii. Syn. Hairy wild Thyme.

7. SERPYLLUM; *latifolium*, hirsutum. C. B. P. Broad-leav'd, hairy, wild Thyme.

8. SERPYLLUM; *vulgare majus*, flore albo. C. B. P. Greater wild Thyme with a white Flower.

9. SERPYLLUM; *vulgare minus*, folio ex albo & viridi vario. H. L. Lesser wild Thyme with variegated Leaves.

The eight first mentioned Sorts do grow wild upon Heaths, and other large open Places, in divers Parts of *England*, where in the *Summer* Time when they are in Flower, they afford an agreeable Prospect, and being trod upon, do emit a grateful aromatick Scent. Their common Places of Growth are upon small Hillocks, where the Ground is dry and uncultivated, where, in a short Time, they propagate themselves plentifully, both from Seeds and by their trailing Branches, which take Roots at their Joints, and so extend themselves every Way.

There are but two of these Species commonly cultivated in Gardens, viz. The *Lemon Thyme*, and that with strip'd Leaves; the first for its agreeable Scent, and the other for the Beauty of its variegated Leaves; these were formerly planted to edge Borders, but as they are very apt to spread, and difficult to preserve in Compass, so they are disused at present for that Purpose.

All these do propagate themselves very fast, by their trailing Branches, which strike out Roots from their Joints into the Earth, and thereby make new Plants; so that from a Root of each, there may soon be a large Stock increased. They may be transplanted either in *Spring* or *Autumn*, and love an open Situation and a dry undunged Soil, in which they will thrive and flower exceedingly, and continue several Years.

SESAMUM:

SESAMUM; Oily-grain.

The Characters are;

The Flowers are produced from the Wings of the Leaves, without any Foot-stalk; the Flower-cup consists of one Leaf, divided into five long, slender Segments; the Flower is of one Leaf, in Shape like those of the Foxglove; the Pointal, which rises in the Middle of the Flower, afterwards becomes an oblong, four-corner'd Pod, divided into four distinct Cells, which are replete with esculent Seeds.

The Species are;

1. SESAMUM; J. B. Common Oily-grain.
2. SESAMUM; alterum, foliis trifidis Orientale, semine obscuro. Pluk. Phyt. Another Eastern Oily-grain with trifid Leaves and dark-colour'd Seeds.
3. SEASAMUM; Orientale, trifidum, flore niveo. Hort. Compt. Eastern Oily-grain with trifid Leaves and white Flowers.

These three Sorts are often promiscuously cultivated in the Fields of Syria, Egypt, Candy, &c. where the Inhabitants use the Seeds for Food; and of late Years these Plants have been introduced in Carolina, where they succeed extremely well: The Inhabitants of that Country make an Oil from the Seed, which will keep many Years, and not take any rancid Smell or Taste, but in two Years becomes quite mild; so that when the warm Taste of the Seed which is in the Oil when first drawn, is wore off, they use it as Sallet-Oil, and for all the Purposes of Sweet-Oil.

In England these Plants are preserved in Botanick Gardens, as Curiosities: Their Seeds must be sown in the Spring upon a Hot-bed, and when the Plants are come up, they must be transplanted into a fresh Hot-bed to bring 'em forward; after they have acquired a tolerable Degree of Strength, they should be planted into Pots filled with rich, light, sandy Soil, and plunged into another Hot-bed, managing them as hath been directed for *Amaranthus's*, to which I shall refer the Reader, to avoid Repetition. For if these Plants are not brought forward thus in the former part of the Summer, they will not produce good Seeds in this Country; though after they have flowered, if the Season is favourable, they may be exposed in a warm Situation with other annual Plants. When these Plants have perfected their Seeds, they decay, and never continue longer than one Season.

The Seeds of the first Sort is mentioned in the List of *Officinal Simples* in the College Dispensatory, but is rarely used in Medicine in England. From nine Pounds of this Seed, which came from Carolina, there were upwards of two Quarts of Oil produced, which is as great a Quantity as hath been known to be drawn from any Vegetable whatever, and this I suppose might occasion its being called Oily-grain.

SIDERATION; a Blasting of Trees or Plants by an easterly Wind, or excessive Heat or Drought.

SIDERITIS, [of *σίδηρος*, Iron, q. Iron Herb, so *Dioscorides* calls those Herbs that are good against Wounds made by the Sword: It is also called *Ferrum Matrix* on the same Account. It is also called *Herba Judaica*, because the Jews in old Time made use of this Herb in Medicine.] Iron-wort.

The Characters are;

It is a Plant with a labiated Flower, consisting of one Leaf, whose Upper-lip, or Crest, is upright, but the Under-lip, or Beard, is divided into three Parts; out of the Flower-cup rises the Pointal, attended as it were by four Embryo's, which afterwards turn to so many oblong Seeds, shut up in a Husk, which was before the Flower-cup: To these Marks must be added, the Flowers growing in Whorles as the Wings of the Leaves, which are cut like a Crest, and differ from the other Leaves of the Plant.

The Species are;

1. SIDERITIS; *hirsuta, procumbens*. C. B. P. Hairy trailing Iron-wort.
2. SIDERITIS; *Alpina, hyssopifolia*. C. B. P. Hyssop-leav'd Iron-wort of the Alps.
3. SIDERITIS; *Orientalis, phlomidis folio*. T. Cor. Eastern Iron-wort with a Phlomis Leaf.

There are several other Species of this Plant, which are preserved in some curious Botanick Gardens for Variety; but as they are Plants of little Beauty, so they are seldom cultivated in other Gardens.

All these Plants may be propagated by sowing their Seeds in the Spring, upon a Bed of fresh light Earth, and when the Plants are come up, they may be transplanted out into other Beds, allowing 'em a Foot Distance from each other, observing to water them until they have taken Root, after which they will require no farther Care, but to keep 'em clear from Weeds; the second Year they will produce Flowers and Seeds, and some of the Sorts will perish soon after, but others will abide several Years, provided they are not planted in a Soil too moist.

SILQUA; Carob or St. John's Bread.

The Characters are;

It hath an apetalous Flower, having many Stamina which, grow from the Divisions of the Flower-cup; in the Center of which rises the Pointal, which afterwards becomes a Fruit or Pod, which is plain and fleshy, containing several roundish plain Seeds.

We have but one Species of this Plant in England, viz.

- SILQUA; *edulis*. C. B. P. The Carob-Tree, or St. John's Bread, *vulg.*

This Tree is very common in Spain, and in some Parts of Italy, as also in the Levant, where it grows in the Hedges, and produces a great Quantity of long, flat, brown-colour'd Pods, which are thick, mealy, and of a sweetish Taste: These Pods are many times eaten by the poorer Sort of Inhabitants, when they have a Scarcity of other Food; but they are apt to loosen the Belly, and cause Gripings of the

the Bowels. These Pods are directed by the *College of Physicians* to enter some medicinal Preparations, for which Purpose they are often brought from Abroad.

In *England* the Tree is preserved by such as delight in Exotick Plants, as a Curiosity: The Leaves do always continue green, and being different in Shape from most other Plants, do afford an agreeable Variety, when intermix'd with *Oranges*, *Myrtles*, &c. in the Green-house.

These Plants are propagated from Seeds, which, when brought over fresh in the Pods, should be sown in the *Spring* upon a moderate Hot-bed, and when the Plants are come up, they should be carefully transplanted, each into a separate small Pot, filled with light, rich Earth, and plunged into another moderate Hot-bed, observing to water and shade 'em until they have taken Root; after which you must let them have Air in proportion to the Heat of the Weather. In *June* you must inure them to the open Air by Degrees, and in *July* they should be removed out of the Hot-bed, and placed in a warm Situation, where they may remain until the Beginning of *October*, when they should be removed into the Green-house, placing them where they may have free Air in mild Weather, for they are pretty hardy, and do require only to be shelter'd from hard Frosts. When the Plants have remained in Pots three or four Years, and have gotten Strength, some of 'em may be turned out of the Pots in the *Spring*, and planted into the full Ground, in a warm Situation, where they will endure the Cold of our ordinary *Winters* very well, but must have some Shelter in very hard Weather.

I have not as yet seen any of these Trees produce Flowers, though from some which have been planted some Time against Walls, it is probable there may be Flowers and Fruit in a few Years.

SILICUASTRUM: The Judas-Tree.

The Characters are;

It hath a papilionaceous Flower, whose Wings are placed above the Standard; the Keel is composed of two Petals; the Pointal which rises in the Center of the Flower-cup, and is encompassed with the Stamina, afterwards becomes a long flat Pod, containing several kidney-shap'd Seeds: To which may be added, roundish Leaves growing alternately on the Branches.

The Species are;

SILICUASTRUM: *Cast. Durant.* The Judas-Tree, *vulgô.*

2. SILICUASTRUM; *Canadense. Tourn.* Canada Judas-Tree.

3. SILICUASTRUM; *quæ Ceratia agrestis, mucronato folio, floribus parvis Caroliniana. Pluk. Alm.* Carolina Judas-Tree with pointed Leaves.

The first of these Trees is very common in the South Parts of *France*, *Italy*, and *Spain*, from whence it was formerly brought into *England*, and preserved as a Curiosity in Green-houses, but of late Years they have been transplanted into the open Air, where

they thrive very well, and produce great Quantities of beautiful Flowers in the *Spring*, and in favourable Seasons do perfect their Seeds extremely well.

The second Sort is very common in *Virginia*, *New-England*, *Canada*, and most of the Northern Countries of *America*, where it is called *Red-bud*; which Name, I suppose, it receiv'd from the beautiful Colour of its Flower-buds, which when fully expanded, are of a soft, purple Colour. These Flowers are produc'd in large Clusters from the old Wood of the Tree; and being opened before the Green Leaves come out, they make a beautiful Appearance especially when the Trees are old and productive of Flowers; when many times the large Branches of the Tree are intirely cover'd with these beautiful Flowers, so as to afford as great Pleasure as any sort of flowering Tree whatever. These Flowers are commonly gather'd in *America*, and put into their Sallets, to which they add a quick, poignant, agreeable Flavour; and in *England* they are by some curious Persons used for the same Purpose.

The third Sort was brought from *Carolina*, where it grows in the Woods in great Plenty. This differs greatly in the Shape of its Leaves from the other two Sorts, and the Flowers are much smaller. At present this is less common in the *English* Gardens, and will not endure the Cold of our Climate so well, being subject to have the young Shoots destroy'd in very hard *Winters*; and if the Plants are young, sometimes they will die to the Ground.

These Plants may be propagated by sowing their Seed upon a Bed of light Earth towards the latter End of *March* or the Beginning of *April* (and if you put a little hot Dung under the Bed, it will greatly facilitate the Growth of the Seeds;) when your Seeds are sown, you should sift the Earth over them about half an Inch thick; and, if the Season prove wet, it will be proper to cover the Bed with Mats, to preserve it from great Rains, which will burst the Seeds, and cause them to rot.

When the Plants are come up, they should be carefully clear'd from Weeds, and in very dry Weather must be now and then refresh'd with Water, which will greatly promote their Growth. The *Winter* following, if the Weather be very cold, it will be proper to shelter the Plants, by covering them either with Mats or dry Straw in hard Frosts, but they should constantly be opened in mild Weather, otherwise they will grow mouldy, and decay.

About the Beginning of *April* you should prepare a Spot of good fresh Ground, to transplant these out (for the best Season to remove them is just before they begin to shoot); then you should carefully take up the Plants, being careful not to break their Roots, and plant 'em in the fresh Ground as soon as possible, because if their Roots are dried by the Air, it will greatly prejudice them.

The Distance these should be planted must be proportionable to the Time they are to remain before they are again transplanted; but commonly they are planted two Feet, Row from

from Row, and a Foot afunder in the Rows, which is full Room enough for them to grow two or three Years, by which Time they should be tranſplanted where they are deſign'd to remain; for if they are too old when remov'd, they ſeldom ſucceed ſo well as younger Plants.

The Ground between the Plants ſhould be carefully kept clean from Weeds in *Summer*, and in the *Spring* ſhould be well dug to looſen the Earth, that their Roots may better extend themſelves every Way: You ſhould alſo at that Seafon prune off all ſtrong ſide Branches, (eſpecially if you intend to train them up for Standard Trees) that their Top Branches may not be check'd by their Side Shoots, which do often attract the greateſt Part of the Nouriſhment from the Roots; and if their Stems are crooked, you muſt place a ſtrong Stake down by the Side of each Plant, and faſten the Stem to it in ſeveral Places, ſo as to render it ſtrait, which Direction it will ſoon take as it grows larger, and thereby the Plants will be render'd beautiful.

When they have remain'd in this Nurſery three or four Years, they ſhould be tranſplanted in the *Spring* where they are deſign'd to remain, which may be in Wilderneſs Quarters among other flowering Trees, obſerving to place them with Trees of the ſame Growth, ſo as they may not be over-hung, which is a great Prejudice to moſt Sorts of Plants.

The uſual Height to which theſe Trees grow with us, is from twelve to twenty Feet, according to the Goodneſs of the Soil; tho' I don't remember ever to ſee any of them exceed that Growth, where they have enjoy'd the greateſt Advantages, nor do I believe the *Carolina* Sort will arrive to near that Height.

SILIQUEOUS; having Seed-Veſſels, Huſk, Pod, or Shell.

SINAPI; (*Σινάπι*, of *σιν* and *πικρά*, becauſe it forces Tears from the Eyes of thoſe that uſe it uncautiously, makes the Noſe red, and the Eyes ſwell.] Muſtard.

The Characters are;

The Flower conſiſts of four Leaves, which are placed in form of a Croſs, out of whoſe Flower-cup riſes the Pointal, which afterwards becomes a Fruit or Pod, divided into two Cells by an intermediate Partition, to which the Valves adhere on both Sides, and are filled with roundiſh Seeds; theſe Pods generally end in a fungous Horn, containing the like Seeds. To theſe Marks muſt be added an acrid Burning Taſte peculiar to Muſtard.

The Species are;

1. **SINAPI**; *filiquâ latiuſculâ glabrâ, ſemine ruſo, ſive vulgare.* J. B. Common or Red Muſtard.

2. **SINAPI**; *hortenſe, ſemine albo.* C. B. P. Garden or White Muſtard.

3. **SINAPI**; *Indicum, lactuæ folio.* Par. Bat. Indian Muſtard, with a Lettuce Leaf.

There are ſeveral other Species of this Plant, which are preſerv'd in curious Botanick Gardens for Variety; but as they are not in uſe,

nor have any thing valuable to recommend 'em, I ſhall not enumerate them here.

The firſt Sort is very common in the *Iſle of Ely* in *Cambridgeſhire*, and in many other Places where the Land has been flooded with Water for many Years; but upon being drain'd, this Plant comes up in a moſt plenteous Manner, which has given Occaſion for ſome Perſons to imagine that it was produc'd ſpontaneouſly without Seeds; but the contrary of this has been fully prov'd by ſeveral learned Gentlemen, and therefore would be needleſs to repeat here; for the Reaſon why theſe Seeds do remain good for ſo many Years, when cover'd with Water, is, becauſe they abound with ſo ſharp an Oil, that it prevents the Water from pervading its Body, and being kept from the Air, is preſerv'd from Corruption.

This Sort is alſo cultivated in Gardens and Fields in divers Parts of *England* for the Sake of its Seeds. The Method of cultivating this Plant, is to ſow the Seeds upon an open Spot of Ground (which hath been well dug or plough'd) in the *Spring*, and when the Plants are come up, they ſhould be hoed, in order to deſtroy the Weeds, as alſo to cut out the Plants where they are too thick, leaving them about ten Inches afunder (for when they are left too thick, they draw up weak, and the Seeds are never ſo large and well nourish'd); and if the Weeds ſhould grow again before the Plants have gotten Strength enough to bear them down, they muſt be hoed a ſecond Time; after which they will require no farther Care until the Seeds are ripe, when the Haulm ſhould be cut down, and ſpread upon the Ground to dry, and then the Seeds may be thrash'd out.

The ſecond Sort is chiefly cultivated in Gardens for a Salad Herb in the *Winter* Seafon. The Seeds of this are commonly ſown very thick in Drills, either upon a warm Border, or in very cold Weather upon a Hot-bed, with Crefſes and other ſmall Salad Herbs, which are commonly fit for uſe in three Weeks or a Month from ſowing; for if they are large, they are too ſtrong to put into Salads. In order to ſave the Seeds of this Plant, a Spot of Ground muſt be ſown with it in the *Spring*, which ſhould be manag'd in the ſame manner as the former.

The third Sort may alſo be uſed in Salads when its very young, at which Time it has no diſagreeable Taſte; but as it grows large, ſo its Strength increaſes, and a certain Bitterneſs, which renders it very diſagreeable. This is very hardy, and when allow'd ſufficient Room, will ſpread very far, and produce large Leaves.

The Seeds of the firſt two Species are order'd for Medicinal Uſe, but the third is ſeldom cultivated for Uſe in *England*.

SINAPISTRUM; (ſo call'd as though *Sinapi parvum*, diminutive Muſtard; becauſe it is like Muſtard in Shape and Acrimony.)

The Characters are;

The Flower conſiſts of four Leaves, which are plac'd in form of a Croſs, but are erect'd;
7 M under

under these Petals are plac'd six Stamina, which occupy the under Part of the Flower; out of whose Flower-cup rises the Pointal, which afterwards becomes a Cylindrical Pod, with two Valves, and fill'd with roundish Seeds.

The Species are;

1. SINAPISTRUM; *Indicum, pentaphyllum, flore carne minus non spinosum. H. L.* Indian five-leav'd Sinapistrum, with a flesh-colour'd Flower, and not prickly.

2. SINAPISTRUM; *Aegyptiacum, heptaphyllum, flore carneo majus spinosum. H. L.* Greater prickly seven-leav'd Egyptian Sinapistrum, with a Flesh-colour'd Flower.

3. SINAPISTRUM; *Zeylanicum, triphyllum & pentaphyllum, viscosum, flore flavo. Boerb.* Three and five-leav'd viscous Sinapistrum, from Ceylon, with a yellow Flower.

The first and second Sorts are very common in Jamaica, Barbadoes, and other warm Countries in the West-Indies; but the third Sort I received from Dr. Boerhaave, who had it from Ceylon, with many other curious Seeds.

These Plants are preserv'd as Curiosities by those who delight in Botanick Studies; but as they are not very beautiful, nor of any great Use, so they are rarely cultivated in other Gardens. They are all annual Plants, which perish soon after their Seeds are ripe; and in England must be rais'd in a Hot-bed in the Spring, and when the Plants have acquir'd Strength, they should be planted into Pots, and manag'd as hath been directed for the Female Balsamines, to which Article the Reader is desir'd to turn, to avoid Repetition. In July these Plants may be plac'd in the open Air, at which Time they will flower, and in September their Seeds will ripen, when they should be gather'd, and preserv'd in their Pods until the Season for sowing them.

SISARUM; [so call'd on account of its sweet Taste, scarce any Plant being of a sweeter.] Skirret.

The Characters are;

It produces its Flowers in an Umbel, which consist of several Leaves plac'd circularly, and expand in Form of a Rose; the Empalement afterwards becomes a Fruit, compos'd of two narrow Seeds, that are gibbous and furrow'd on one Side, but plain on the other: To these Marks must be added, that the Roots are shap'd like long Turnips, and are join'd to one Head.

We have but one Species of this Plant, viz.

SISARUM; *Germanorum. C. B. P.* Skirrets.

This is one of the wholesomest and most nourishing Roots that is cultivated in Gardens, and yet it is at present very rare to meet with it in the Gardens near London: What may have been the Cause of its not being more commonly cultivated, I can't imagine, since there are many Kitchen Gardens which are proper for this Plant.

It may be propagated two Ways, viz. either by sowing the Seeds, or planting the Slips: The former Method is what I would chiefly recommend, because the Roots which come from Seeds are much larger than those produc'd from Off-sets, and are much ten-

derer. The Season for sowing the Seed is in the Beginning of February, and upon a moist rich Soil, which should be well dug and loosen'd, and being laid level, the Seeds should be sown thereon, and then trod in, after the common Method of sowing Radishes, raking the Ground over them smooth.

In April the Plants will come up, at which Time the Ground should be hoed over, (as is practis'd for Carrots) to destroy the Weeds, and to cut out the Plants where they are too close, leaving them the first hoeing about three Inches asunder; but at the second hoeing, which should be perform'd about a Month after the first, they should be cut out to six Inches apart at least, observing to cut down all the Weeds; and during the Summer Season, the Weeds should be diligently hoed down as fast as they are produced, for if these Plants are stifled by Weeds, &c. they seldom come to good.

When their Leaves are decay'd, their Roots may be taken up for Use; but this should be done only as they are wanted, for if they are kept long above Ground they will be good for little. The Leaves commonly decay in October, so that from that Time till the Middle of March, when they begin to shoot again, they are in Season; but after they have shot forth green Leaves, the Roots become sticky, and are not so good.

The Method of propagating this Plant from Off-sets is as follows: About the latter end of February or Beginning of March, you should dig a moist rich Spot of Ground, in Size proportionable to the Quantity of Plants intended; then you should carefully dig up the old Roots, from which you should slip off all the Off-sets, preserving their Buds on the Crown of each intire; after this you should open a Drill cross the Spot of Ground with a Spade, in a strait Line, about eight or nine Inches deep, into which you should place the Off-sets, about six Inches apart, as upright as possible; then fill the Drill up again with the Earth which came out of it, and at a Foot Distance from the first make another Trench, laying the Off-sets therein, as before, and so continue the Drills at a Foot Distance, through the whole Spot of Ground; and if the Season should prove very dry, it will be proper to water them until they have taken Root in the Ground; after which they will require no other Care, but to keep the Weeds constantly destroy'd as they are produc'd, in the manner before directed for the seedling Plants, and when their Leaves decay, they will be fit for use, as before; but after any of these Roots have seeded, they are sticky, and good for nothing, so that they should never be more than one Year old.

SMALLAGE; *vide Apium.*

SMILAX; [so call'd of *sudax*, Gr. to scrape, because it is a rough Plant. It is also call'd *Unifolium*, because at first it bears but one Leaf.] Bindweed.

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The Characters are ;

The Flower consists of several Leaves, which are plac'd circularly, and expand in form of a Rose, whose Pointal afterwards becomes a Fruit or soft roundish Berry, containing oval-shap'd Seeds.

The Species are ;

1. SMILAX ; *aspera, fructu rubente*. C. B. P. Rough Bindweed, with a red Fruit.

2. SMILAX ; *viticulis asperis, foliis longis angustis, mucronatis lœvibus auriculis ad basim rotundioribus*. Pluk. Phyt. Rough Bindweed, with long, narrow-pointed, smooth Leaves, having round Ears at the Base.

3. SMILAX ; *viticulis asperis Virginiana, folio hederaceo lœvi, Zarza nobilissima nobis*. Pluk. Phyt. Rough Virginian Bindweed, with a smooth Ivy Leaf, commonly call'd Zarzaparilla.

There are several other Species of this Plant, which grow wild in Virginia, Carolina, and other Parts of America, in the Woods, where they climb round the Stems of Trees and Shrubs to support themselves, for their Branches are very weak and trailing, and if not supported, do lie upon the Ground.

These Plants are preserv'd in the Gardens of such as are curious in Botany for their Variety ; but there is no great Beauty or Use in them, so that they are not very commonly cultivated in other Gardens.

They are most of them hardy enough to endure the Cold of our Climate, if planted in a light Soil, and under the Shelter of Trees, where they delight to grow : They may be easily propagated by Off-sets taken from the old Roots in March, just before they begin to shoot, and transplanted where they are to remain, where if it be in a good Soil they will flower very well, but they seldom produce Fruit in this Country.

But as the Seeds are often brought into England, so they may be sown in Pots of light rich Earth, and plac'd in a shady Situation in Summer ; but in Winter they must be remov'd into Shelter, observing always to keep the Earth moist, and the following Spring the Plants will come up, when the Pots should be again remov'd into the Shade, and kept clear from Weeds, watering them in dry Weather ; and the Spring following they may be transplanted where they are to remain.

SMYRNIUM ; [of *συμνή*, Myrrha, because it resembles Myrrh in Taste and Smell ; or because that Plant which the Antients call'd Smyrnum, by Incision yielded a like Liquid.] Alexanders.

The Characters are ;

The Flowers are produc'd in Umbels, consisting of several Leaves, which are placed orbicularly, and expand in form of a Rose : These rest upon the Empalement, which afterwards becomes an almost globular Fruit, compos'd of two pretty thick Seeds, sometimes shap'd like a Crescent, gibbous, and break'd on one Side, and plain on the other.

The Species are ;

1. SMYRNIUM ; *Matth.* Common Alexanders.

2. SMYRNIUM ; *peregrinum, rotundo folio*. C. B. P. Foreign Alexanders, with a round Leaf.

3. SMYRNIUM ; *peregrinum, folio oblongo*. C. B. P. Foreign Alexanders, with an oblong Leaf.

4. SMYRNIUM ; *Creticum, Paludarii foliis*. 7. Cor. Candy Alexanders with a Smallage Leaf.

The first of these Sorts (which is that order'd by the College for medicinal Use) grows wild in divers Parts of England, and at present is seldom cultivated in Gardens ; tho' formerly it was greatly used in the Kitchen, before Sallery was so much cultivated, which hath taken Place of Alexanders in most Peoples Opinion. The other Sorts are preserv'd in Botanick Gardens for Variety, but may either of them be cultivated for the Use of the Kitchen. The second Sort is much preferable to the first for blanching, as I have try'd, and will be tenderer, and not quite so strong.

All these Plants may be propagated by sowing their Seeds upon an open Spot of Ground in August, so soon as they are ripe ; for if they are preserv'd till Spring, they often miscarry, or at least do not come up until the second Year ; whereas those sown in Autumn, do rarely fail of coming up soon after Christmas, and will make much stronger Plants than the other.

In the Spring these Plants should be hoed out, so as to leave them ten Inches or a Foot apart each Way ; and during the following Summer they must be constantly clear'd from Weeds, which if permitted to grow amongst them, will draw them up slender, and render them good for little. In February following the Plants will shoot up again vigorously, at which Time the Earth must be drawn up to each Plant to blanch 'em ; and in three Weeks after, they will be fit for Use, when they may be dug up, and the white Part preserv'd, which may be stew'd, and eaten as Sallery.

SNAP-DRAGON ; *vide* Antirrhinum.

SNEEZ-WORT ; *vide* Ptarmica.

SNOW is defin'd to be a Meteor form'd in the middle Region of the Air, of Vapour rais'd by the Action of the Sun or subterraneous Fire ; there congeal'd, its Parts constricted, its specifick Gravity increased, and thus return'd to the Earth in the Form of little Villi or Flakes.

The Snow we receive may properly enough be ascrib'd to the Coldness of the Atmosphere through which it falls : When the Atmosphere is warm enough to dissolve the Snow before it arrives at us, we call it Rain ; if it preserves itself undissolv'd, we call it Snow.

Snow is very useful ; it fructifies the Ground, it guards Corn or other Vegetables from the intenser Cold of the Air, especially the cold piercing Winds.

It is suppos'd to abound with salifick and fertile Particles, as much or more than Rain ; however, it is accounted more ponderous, and by

by that means sinks deeper into the Ground than Rain does, and therefore is in some Cases of more Benefit to planting ; for which Reason some lay Heaps of Snow round the Feet of their Forest Trees, especially in hot burning Lands.

Monf. Le Clerc says, that some Parts of a Cloud which should turn into Rain, are sometimes prevented by the Cold, and form'd into a Consistence which we call Snow ; which appears to be form'd of watery Particles, from hence, that when it dissolves, it turns into Water ; so that we may easily conceive Snow to be made of watery Particles, harden'd by Cold, and gather'd into Flakes, in such a manner, as to leave large Interstices between one another ; which Snow is not transparent, as the Water, because its more rigid Particles being huddled together by Chance, don't leave strait Pores between one another, and so keep out the Matter of Light.

But when it happens that the Region of the Air under the Cloud is very cold, the Drops of Rain are congealed as they fall, and come down in Lumps, which are call'd Hail ; and these Lumps are greater or less, according to the Bigness of the Rain Drops of which they are form'd ; and these Lumps of Hail are also variously figured.

Dr. Grew, in a Discourse of the Nature of Snow, observes, that many Parts thereof are of a regular Figure, for the most Part, being, as it were, so many little Rowels or Stars of perfect and transparent Ice ; upon each of which Points are set other collateral Points, at the same Angles as the main Points themselves : Amongst these there are divers other irregular, which are chiefly broken Points and Fragments of the regular ones ; others also, by various Winds, seem to have been thaw'd, and frozen again into irregular Clusters, so that it seems as if the whole Body of Snow were one intire Mass of Icicles irregularly figur'd ; that is, a Cloud of Vapours being gather'd into Drops, the said Drops do forthwith descend, and in their Descent meeting with a freezing Air, as they pass through a colder Region, each Drop is immediately frozen into an Icicle, shooting itself forth into several Points ; but still continuing to descend, and meeting with some intermitting Gales of warmer Air, or by their being continually wasted to and fro, touching upon one another, some are a little thaw'd, blunted, and again frozen into Clusters, or intangled so as to fall again in what we call Flakes ; altho' Snow is firm Ice, and the Lightness of it is owing to the Excess of its Surface, in Comparison to the Matter contain'd in it ; as Gold itself may be extended in Surface, till it will ride upon the least Breath of Air.

SNOW-DROP ; *vide* Narcisso-Leucojum.

SOIL ; *vide* Earth.

SOLANUM ; [so call'd of *solari*, Lat. to comfort, because this Plant sweetens the Humours.] Nightshade.

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The Characters are ;

The Flower consists of one Leaf, which is divided into five Parts, and expands in form of a Star ; from the Flower-cup rises the Pointal, which afterwards becomes a round or oval soft succulent Fruit, containing many flat Seeds in each.

The Species are ;

1. SOLANUM ; *officinatum, acinis nigricantibus*. C. B. P. Common Nightshade of the Shops, with black Fruit.

2. SOLANUM ; *officinatum, acinis puniceis*. C. B. P. Nightshade, with red Fruit.

3. SOLANUM ; *officinatum, acinis luteis*. C. B. P. Nightshade, with yellow Fruit.

4. SOLANUM ; *scandens, seu Dulcamara*. C. B. P. Perennial climbing Nightshade, commonly call'd Bittersweet.

5. SOLANUM ; *scandens, seu Dulcamara, flore albo*. C. B. P. Perennial climbing Nightshade, with a white Flower.

6. SOLANUM ; *scandens, foliis variegatis*. H. R. Par. Perennial climbing Nightshade, with variegated Leaves.

7. SOLANUM ; *fruticosum, bacciferum*. C. B. P. Shrubby Berry-bearing Nightshade, commonly call'd Amomum Plinii.

8. SOLANUM ; *Guineense, fructu magno instar Cerasi nigerrimo umbellato*. Boerb. Ind. Nightshade from Guiney, with large Fruit, resembling Black Cherries, which grow in an Umbel.

9. SOLANUM ; *spiniferum, frutescens, spinis igneis Americanum*. Pluk. Phyt. Shrubby and thorny American Nightshade, with Fire-colour'd Thorns.

10. SOLANUM ; *spinosum, maxime tormentosum*. Bocc. Rar. Plant. Thorny Nightshade, very much cover'd with a Wooll or Down.

11. SOLANUM ; *Americanum, spinosum, foliis Melongenæ, fructu mammoso*. D. Lig. Journ. Thorny American Nightshade, with Leaves like those of Mad Apple, and a Fruit shap'd like an inverted Pear, commonly call'd in Barbadoes Batchelors Pear.

12. SOLANUM ; *pomiferum, frutescens, Africanum, spinosum nigricans flore boraginis, foliis profunde liciniatis*. H. L. Shrubby African Apple-bearing Nightshade, with black Thorns, a Flower like Borage, and deeply jagged Leaves, commonly call'd Pomum Amoris.

13. SOLANUM ; *tuberosum, esculentum*. C. B. P. Potatoes.

14. SOLANUM ; *tuberosum, esculentum, flore albo*. H. R. Par. White Potatoes.

There are several other Species of this Plant, which are preserv'd in some curious Botanick Gardens for Variety ; but those here mention'd being the most valuable Sorts I have observ'd in the English Gardens, I shall not enumerate the others.

The first Sort is now very common upon Dunghills, and on rich cultivated Soils in many Parts of England, where it often becomes a troublesome Weed. This is the Sort which the College of Physicians have directed to be used in Medicine, under the Title of *Solanum hortense*. The second and third Sorts are very near

near to the first, differing from it in the Colour of their Fruits, and the Plants being woolly. The eighth Sort produces much larger Fruit than either of the former, and the Plants grow proportionably larger.

All these Sorts are annual Plants, which may be propagated by sowing their Seeds in *March* upon a Bed of light, rich Earth, in a warm Situation; and when the Plants come up, they should be transplanted out into fresh Beds of rich Earth, at about six Inches Distance, observing to water and shade them until they have taken Root, as also to keep them clear from Weeds, and in very dry Weather they should be often refresh'd with Water: In these Beds they may remain until they have grown so large as to meet each other, when they may be taken up, with a good Ball of Earth to each Plant, and planted where they are to remain, observing to allow 'em at least two Feet Distance, otherwise they will spread over each other, or any other Plants which grow near them. This Care may be taken with a few Plants of the red and yellow-berry'd and *Guiney* Sorts for the sake of Variety, but the common Sort, if permitted to scatter its Seeds, will come up in Plenty without any Care.

The fourth Sort is a climbing woody Plant, which grows in the Hedges in divers Parts of *England*, and is by some planted in Gardens to cover Arbours or shady Walls in *London*, and other close Places, where few other Plants will thrive. This Plant is also used in Medicine for some particular Preparations; but the Herb-folks in the Markets do often sell this instead of the Garden *Nightshade*, which is a cooling Plant, and this a hot, acrid one, which renders it contrary to the Intention of the Ointment, wherein *Nightshade* is one of the Ingredients.

The Sort with white Flowers is a Variety of the former, as is also that with variegated Leaves, both which are preserv'd by those who are very curious in collecting the various Kinds of Plants.

These may be easily propagated by laying down their Branches, or by planting their Cuttings in the *Spring* upon a moist Soil, where they will soon take Root, and may afterwards be transplanted where they are to remain.

The *Anomum Plinii* is propagated in great Plenty for the Beauty of its large red Fruit, which is always ripe in *Winter*; so that when the Trees have Plenty of Fruit, they make a very handsome Appearance in a Green-house, when intermix'd with *Orange*, *Myrtle*, and other Exotick Trees.

This Plant may be propagated by sowing its Seeds in a Pot of rich Earth in the *Spring*, placing it upon a moderate Hot-bed, which will greatly facilitate the Growth of the Seeds: The Earth in the Pot should be frequently water'd, for if it is kept too dry the Seeds will not grow. When the Plants are come up, you should make a gentle Hot-bed, which must be cover'd with rich Earth about six Inches thick; in this they should be planted

about six Inches Distance each Way, and the Bed arched over with Hoops, &c. and cover'd with Mats, to shade them from the Sun and Cold, observing frequently to water them.

When the Plants have acquir'd Strength, and the Season becomes favourable, you must inure them to bear the open Air by Degrees, to which they should be fully expos'd in *June*, when also they should be taken up, with a Ball of Earth to the Root of each Plant, and plac'd separately in Pots fill'd with rich Earth, which must be set in a shady Situation, and frequently water'd until they have taken Root; after which they may be remov'd into a more open Exposure, and placed amongst other Exotick Plants; but they do require a great Plenty of Water in dry Weather, without which they seldom produce much Fruit.

In *Winter* they must be remov'd into the Greenhouse, and placed in the coldest Part of the House, where they may have as much free Air as possible in mild Weather, being so hardy as many times to endure the Cold of our ordinary *Winters* abroad, when planted in a warm Situation, so that they only require to be shelter'd from severe Frost.

These Plants should be annually shifted about the latter End of *April*, when their Roots should be pared round, cutting off all the mouldy Fibres which were next the Pot, and the Pots fill'd up with fresh, rich Earth, which will strengthen their Flowers, and cause them to produce Plenty of Fruit, which, as I said before, ripens in *Winter*, and being of the Shape and Size of Cherries, are commonly call'd *Winter-Cherries* by the Gardeners.

The ninth and eleventh Sorts are much tenderer than the former, being brought from the warm Parts of *America*: These are also propagated by sowing their Seeds in the *Spring* upon a good Hot-bed, and when the Plants are come up, they should be each transplanted into a separate small Pot fill'd with rich Earth, and plung'd into a fresh Hot-bed, observing to water and shade them until they have taken Root; after which they should have Air and Water in Proportion to the Heat of the Season, and the Bed in which they are placed; and when their Roots have fill'd the Pots in which they were planted, (which they will do in a Month's Time if they thrive) they must be shaken out, and after having gently pared off the Fibres which grew next the Pot, they should be placed in Pots a Size larger, which must be fill'd with fresh, rich Earth, and plung'd into a fresh Hot-bed to bring the Plants forward, observing to water them frequently, for they will not thrive without Plenty of Moisture in warm Weather.

In *July* these Plants may be inur'd to bear the open Air by degrees, into which they may be remov'd if the Season be warm; but otherwise they must always be preserv'd either under Glasses or in the Stove; and if they are plac'd in the open Air, they should not remain there longer than the Middle of *August*, lest the Nights growing cold, should hurt them: During the *Winter* Season they must be preserv'd

serv'd in the Stove, observing to water them frequently, and the second Year they will produce Flowers and Fruit.

The tenth and twelfth Sorts are not so tender as the last, but require an open airy Glass-Case, or a warm Green-house in *Winter*, but in *Summer* may be expos'd in the open Air with other Exotick Plants. These may be propagated by sowing their Seeds on a Hot-bed as the former, and should be manag'd as hath been directed for them, with this Difference, that they may be much sooner expos'd to Air, and should not be bred so tenderly. These are preserv'd for their odd Appearance, by such as are curious in cultivating Exotick Plants; their Fruits being ripe in *Winter* do afford a Variety in the Green-house, and their Leaves and Flowers being very remarkable in their Colour, Shape, &c. do render them worthy of a Place in every good Collection of Plants.

There is also another Variety which differs very much from the tenth Sort, tho' call'd by that Name in most of the *English* Gardens where it is preserv'd, which I believe came from *Virginia*, and being somewhat like the Figure given by *Pere Boccone* of the tenth Sort, I suppose was taken for the same Plant; but they are very different from each other, as appear'd by some Plants which I rais'd from Seeds sent me by *Signior Tili* Professor of Botany at *Pisa*, of *Boccone's* Plant, and others rais'd from the old Sort which came from *Virginia*, both which being cultivated together, retain'd a specifick Difference.

The Red and White *Potatoes* are both indifferently cultivated in *England*; tho' the red Sort is most commonly brought to the Markets. These Plants were originally brought from *Virginia* into *Europe*, where they are at present so generally esteem'd, as to be one of the most common esculent Roots now in Use.

These Plants are propagated by planting the smallest Roots in *Spring*, which, in a good Soil, will multiply exceedingly; for I have many times seen ten, twelve, or more Roots produced from a single Off-set in one Year.

The Soil on which these should be planted, ought to be rather moist than dry, and of a rich, soft, loose Texture; for if the Ground be too dry or binding, they will produce but very small Roots, and those but sparingly. This Soil should be well dug or plough'd, and the small Roots laid in Trenches or Furrows six Inches deep, and about six Inches asunder in the Furrows; but the Furrows must be a Foot Distance from each other, for when they are too close, their Roots will not be large, which is what People usually cover.

In the *Spring* and *Summer* Months, the Weeds should be carefully hoed down between the Plants, until their Haulm is strong enough to bear them down, and prevent their Growth: And when their Haulm decays in *Autumn*, the Roots may be taken up for Use; which may be done as they are wanted, till the Frost begins to set in; when there must be a Quantity taken up, and laid in Sand in a dry Cellar,

where they may be protected from Frost. The best of these may be taken out for Use in *Winter*, and the small ones reserv'd to plant in the *Spring*.

SOLSTICE is the Time when the *Sun* is in one of the solstitial Points; that is, when he is at his greatest Distance from the *Equator*, which is twenty-three Degrees and an half: Thus call'd, because he then appears to stand still, and not to change his Place in the Degrees of the *Zodiack* any way; an Appearance owing to the Obliquity of our Sphere, and which those who live under the *Equator* are Strangers to.

The Solstices are two in each Year; the *Estival* or *Summer Solstice*, and the *Hyemal* or *Winter Solstice*.

The *Summer Solstice* is, when the *Sun* is in the Tropick of *Cancer*, which is on the eleventh of *June*, when he makes our longest Day.

The *Winter Solstice* is, when the *Sun* enters the first Degree of *Capricorn*, which is on the eleventh of *December*, when he begins to return towards us, and make our shortest Day.

This is to be understood, as in our Northern Hemisphere; for in the Southern, the *Sun's* Entrance into *Capricorn* makes the *Summer Solstice*, and that into *Cancer* the *Winter Solstice*.

SONCHUS; [of *ζῶν*, *Life*, and *χέω*, to pour out, because this Plant yields an excellent Juice against Inflammations.] Sowthistle.

These are most of them Weeds in *England*, and are not planted in Gardens, for if their Seeds are once permitted to scatter upon the Ground, they will soon stock it with Plants; for which Reason they should always be extirpated, not only those in the Garden, but also in the Parts near it, because their Seeds being furnish'd with Down, are waisted in the Air to a considerable Distance; where, falling to the Ground, they soon come up, and prove troublesome.

SORBUS; [so call'd of *Sorbere*, *Lat.* to sup, because the Fruit being ripe is so soft that it may be sup'd.] The Service Tree.

The Characters are;

The Flower consists of several Leaves, which are plac'd orbicularly, and expand in Form of a Rose, whose Flower-cup afterwards becomes a Fruit shap'd like a Pear or Medlar; to which must be added, Pennated Leaves, like those of the Ash.

The Species are;

1. SORBUS; *sativa*. C. B. P. The manur'd Service Tree.

2. SORBUS; *sativa*, *fructu pyrisforma*, *medio rubente*. H. Catb. The manur'd Service, with Pear-shap'd Fruit, red in the Middle.

3. SORBUS; *sativa*, *fructu serotino*, *minori*, *turbinato rubente*. Tourn. The lesser late-ripe Service, with a Medlar-shap'd Fruit.

4. SORBUS; *aucuparea*. J. B. The wild Service or Quack-beam, by some call'd The Quicken Tree.

5. SORBUS;

5. *SORBUS*; *sylvestris*, *foliis ex luteo variegatis*. The wild Service or Quick-beam, with strip'd Leaves.

The manur'd Service was formerly said to be growing wild in England; but this I believe was a Mistake, for several curious Persons have strictly search'd those Places where it was mention'd to grow, and could not find it, nor could they learn from the Inhabitants of those Countries, that any such Tree had grown there.

In Italy these Trees are very common, where they have a great Variety of Sorts, which were obtain'd from Seeds; but I have not observ'd in the English Gardens more than the three Sorts here mention'd, and those are yet very scarce, for I have not seen more than one large Tree of the true Service in England, which was lately growing in the Gardens formerly belonging to John Tradescant at South Lambeth near Vaux-Hall in Surrey, who was a very curious Collector of rare Plants in King Charles the Second's Time; which Tree was near forty Feet high, and did produce a great Quantity of Fruit annually. There are, indeed, some Trees of middling Growth in the Gardens of Henry Marsh, Esq, at Hammer-smith, which produce Fruit, (from whence several young Plants have been rais'd of late in the Nurseries near London); but these are small when compar'd to that in John Tradescant's Garden.

These Fruits do nearly resemble Medlars in their Nature, being of a very austere Taste till they are rotten, when they have a more agreeable Flavour; but in England their Fruit does not ripen so well as in warmer Countries, and is therefore less esteem'd: However, the Trees are propagated by such Persons as are curious in collecting the various kinds of hardy Trees and Shrubs, for the Oddness of their Leaves and Fruit.

They may be propagated by sowing their Seeds on a moderate Hot-bed in the Spring; and when the Plants are come up, they should be carefully kept clear from Weeds, and in dry Weather water'd; but they should be expos'd to the open Air: For the only Reason for making a Hot-bed, is, to forward the Growth of the Seeds; but if when the Plants are come up, the Bed is cover'd, it will draw the Plants, and spoil them. In this Bed the Plants should remain until the Middle of March the succeeding Spring when there should be a warm, light Spot of Ground prepar'd to receive them; into which they should be planted in Rows two Feet asunder, and a Foot distant in the Rows; observing to take them up carefully, and to plant them as soon as possible that their Roots may not dry.

During the Summer, the Ground should be kept constantly clear from Weeds, and in Winter there should be a little Mulch laid upon the Surface of the Ground about their Roots, to protect them from being injur'd by Frost; but in the Spring the Ground between 'em should be dug, burying the Mulch therein: In doing of which, you must be careful not to cut or injure the Roots of the Plants.

In this Nursery they may continue three or four Years, according to their Growth, when it will be proper to transplant them out where they are to remain. The best Season for which is in March, just before they begin to shoot: The Soil should be warm in which they are planted, and the Situation defended from cold Winds: In which Place they will thrive and produce Fruit in a few Years; but as the Fruit will vary from those which the Seeds were taken from, (as is the Case of most sorts of Fruit) so the surest Method to have the particular Sorts which you intend to cultivate, is to bud or graft them either upon their own or the wild Service Stock; upon which they will take and produce Fruit in a few Years.

The wild Service or Quick-beam grows wild in divers Parts of England, but it is often cultivated in Gardens for Variety. This produces large Bunches of Flowers at the Extremity of its Branches in May, which are succeeded by large roundish Fruit, which change to a beautiful Scarlet Colour in Autumn, when they afford an agreeable Variety in Wilderness-Quarters.

This Tree seldom grows above twenty Feet high, so should be always plac'd in Lines of Trees of the same Growth.

The Wood of this Tree is much commended by the Wheelwright for being all Heart, and it is of great Use for Husbandmens Tools, Goads, &c. The Flowers of this Tree smell very sweet, and the Fruit is extraordinary Food for Thrushes; so that where these Trees are planted, they will greatly frequent.

The Sort with variegated Leaves is preserved by such as are curious in collecting the several Sorts of strip'd Plants, but there is no great Beauty in it. This may be propagated by Layers, or by being budded on the plain Sort, but they will become plain again, if planted on a very rich Soil.

These Trees should have a moist, strong Soil, but will grow in the most expos'd Places, being extremely hardy, which renders them worthy of Care, since they will thrive where few other Trees will succeed.

SORREL; *vide* Acetosa.

SOUTHERNWOOD; *vide* Abrotanum.

SOWBREAD; *vide* Cyclamen.

SPARTIUM; so call'd of *Sparum*, a Dart, because the Rushes of this Plant represent a Dart; or else of the Greek *σπάρειν*, of *σπέρμα*, to sow, because it sows itself. It is also call'd *Monospermum*, of *μῆλον*, single, and *σπέρμα*, Seed, because the Fruit of this Plant contains but one single Seed.] The Broom-Tree.

The Characters are;

It hath a papilionaceous Flower, whose Pointal, which rises from the Flower-cup, afterwards becomes a short, roundish, swelling Pod, containing, for the most Part, one Kidney-shap'd Seed in each.

The Species are;

1. *SPARTIUM*; alterum, *monospermum*, *semine reni simile*. C. B. P. Another Spanish Broom,

Broom, with Pods containing one Kidney-shap'd Seed.

2. SPARTIUM ; *tertium flore albo.* C. B. P. The white Spanish Broom.

These Plants are propagated by sowing their Seeds upon a moderate Hot-bed in the *Spring*; and when they are come up, they must be each planted in a separate small Pot, fill'd with fresh, light Earth, and plung'd into a fresh Hot-bed, observing to water and shade them until they have taken Root; after which they must have a good Share of free Air, by raising the Glasses when the Weather is favourable; and when the Plants begin to have Strength, they must be inur'd to the open Air by Degrees: Into which they should be remov'd in *July*, placing them in a warm Situation, and during the *Summer* Season, they must be frequently water'd; and the Beginning of *October* they must be remov'd into the Green-house, placing them where they may have Air and Sun, and as the Earth of the Pots dries, they must be refresh'd with Water.

The *Spring* following they should be shaken out of the small Pots, and put into others a Size larger, filling them up with fresh, light Earth; and as the Season advances, so they must be inur'd to the open Air again; and in *May* they should be carry'd abroad, and plac'd amongst other Exotick Plants, where they will add to the Variety.

While these Plants are young, they are somewhat tender; but when they are woody, they will endure a greater Degree of Cold; and if planted in a very warm Situation, will endure the Cold of our ordinary *Winters* in the open Air.

The Flowers of these Plants are small, and generally produc'd thinly upon the Branches, so that they do not make a very great Appearance; however, for Variety, they may have a Place in every good Collection of Plants. The Sort with white Flowers will often produce ripe Seeds in *England*, when the *Summer* is warm; but the Seeds of both Sorts may easily be obtain'd from *Spain* or *Portugal*, where they grow wild in great Plenty.

SPINA ALBA ; *vide* Mespilus.

SPINACHIA ; Spinach or Spinage.

The Characters are ;

It hath an apetalous Flower, consisting of many Stamina included in the Flower-cup, which are produc'd in Spikes upon the Male Plants which are barren; but the Embryo's are produc'd from the Wings of the Leaves on the Female Plants, which afterwards becomes a roundish or angular Seed, which in some Sorts have Thorns adhering to them.

The Species are ;

1. SPINACHIA ; *vulgaris, capsula feminis aculeata.* Tourn. The common prickly or narrow-leav'd Spinach.

2. SPINACHIA ; *vulgaris capsula feminis non aculeata.* Tourn. Common smooth-seeded Spinach, with broader Leaves.

3. SPINACHIA ; *vulgaris capsula feminis non aculeata, folio maximo rotundo.* Spinach,

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with smooth Seeds, and a very large round Leaf.

The first of these Sorts is commonly cultivated in Gardens for *Winter* Use, it being much hardier than any of the other Sorts.

The Seeds of this Kind should be sown upon an open Spot of Ground towards the latter End of *July*, observing, if possible, to do it when there is an Appearance of Rain; for if the Season should prove dry for a long time after the Seed is sown, the Plants will not come up regularly, and many times there will not be half a Crop. When the *Spinach* is come up, the Ground should be hoed to destroy the Weeds, and also to cut up the Plants where they are too close, leaving the remaining Plants about four or five Inches asunder: But this should always be done in dry Weather, that the Weeds may be destroy'd after they are cut.

About a Month or five Weeks after the first Hoeing, the Weeds will begin to grow again, therefore the Ground should be then hoed again the second Time, observing, as before, to do it in dry Weather: But if the Season should prove moist, it will be proper to gather the Weeds up after they are cut, and carry 'em off the Ground; for if the *Spinach* is not clean'd before *Winter* from Weeds, they will grow up, and stifle it so that in wet Weather the *Spinach* will rot away.

In *October* the *Spinach* will be fit for Use, when you should only crop off the largest Leaves, leaving those in the Center of the Plants to grow bigger; and thus you may continue cropping it all the *Winter* and *Spring*, until the young *Spinach*, sowed in the *Spring*, is large enough for Use, which is commonly in *April*; at which time the *Spring* advancing, the *Winter Spinach* will run up to Seed, so that you should cut it up, leaving only a small Parcel to produce Seeds.

But the Ground in which this *Winter Spinach* is sown, being commonly planted with early *Cabbages*, it is not proper to let any of the *Spinach* remain there for Seed, but it should be cleared off as soon as ever the *Spinach* is fit for Use, that the *Cabbages* may be earth'd up, and laid clear, which is of great Service to them; therefore you should sow a small Spot of Ground with this sort of *Spinach* on Purpose to stand for Seed, where there should be no other Plants among it.

The two Sorts with smooth Seeds do produce much larger and thicker round Leaves than the former, but being somewhat tenderer, are always sown in the *Spring*, especially the third Sort, which is preferable to either of the former for *Summer* Use.

These are either sown upon an open Spot of Ground by themselves, or else mix'd with *Radish-seed*, as is the common Practice of the *London* Gardeners, who always endeavour to have as many Crops from their Land in a Season as possible: But, where Land is cheap in the Country, it will be the better Method to sow it alone without any other sort of Seed mix'd with it; and when the Plants are come up, the Ground should be hoed to destroy the

the Weeds; and cut out the Plants where they are too close, leaving the remaining about three Inches asunder; and when they are grown so large as to meet, you may then cut out a Part of it to use, thinning them, that they may have Room to spread; and this Thinning may be twice perform'd, as there is Occasion for the *Spinach*, at the last of which the Roots should be left eight or ten Inches asunder; and if then you hoe the Ground over again, to destroy the Weeds, it will be of great Service to the *Spinach*; for if the Land is good upon which it was sown, the third Sort, with this Management, will many times produce Leaves as large as the *Broad-leav'd Dock*, and be extremely fine.

But in order to have a Succession of *Spinach* through the Season, it will be proper to sow the Seed at three different Times in the Spring; the first early in *January*, which must be on a dry Soil; the second the Beginning of *February*, upon a moister Soil; and the third the Beginning of *March*, which should be on a very moist Soil; and this third Sowing should be hoed out thinner the first Time of hoeing it, than either of the former Sowings; for there will be no Necessity to leave it for cutting out thin for use, because the former Sowings will be sufficient to supply the Table 'till this third Sowing is full grown; besides, by leaving it thin at first, it will not be apt to run up to Seed so soon as it would if the Plants were close.

In order to save Seed of either of these Kinds, you should sow an open rich Spot of Ground, with the Sort you intend, in *February*, after the Danger of being injur'd by Frost is over; and when the Plants are come up, they should be hoed out to six or eight Inches Distance, observing to cut down the Weeds at the same Time; and when the Plants have grown about three Weeks or a Month longer, they should be hoed a second Time, when they should be left twelve or fourteen Inches asunder at least; for when they have shot out their Side-branches, they will sufficiently spread over the Ground.

You must also observe to keep 'em clear from Weeds, which if suffer'd to grow amongst the *Spinach*, will cause it to run up weak, and greatly injure it. When the Plants have run up to Flower, you will easily perceive two Sorts amongst them, viz. *Male* and *Female*; the *Male* will produce Spikes of staminate Flowers, which contain the *Farina*, and are absolutely necessary to impregnate the Embryo's of the *Female* Plants, in order to render the Seeds prolific. These *Male* Plants are by the Gardeners commonly called *She Spinach*, and are often by the Ignorant pulled up as soon as they can be distinguished from the *Female*, in order, as they pretend, to give Room for the Seed-bearing to spread; but from several Experiments which I made on these Plants, I find, where-ever the *Male* Plants are entirely removed before the *Farina* is shed over the *Female* Plants, the Seed will not grow which they produce, so that it is absolutely necessary to leave a few of them in

every Part of the Spot; though there may be a great many drawn out where they are too thick, for a small Quantity of *Male* Plants (if rightly situated) will be sufficient to impregnate a great Number of *Female*, because they greatly abound with the *Farina*, which, when ripe, will spread to a considerable Distance, when the Plants are shaken by the Wind.

SPIRÆA FRUTEX, [so called of *σπίρα*, a Rope, because this Shrub is flexible like a Rope.] *Spiræa Frutex*, vulgô.

The Characters are;

The Flower is composed of many Leaves, which are plac'd in a circular Order, and expand in Form of a Rose; out of whose Flower-cup rises the Pointal, which afterwards becomes a Fruit composed of several Pods, in which are contain'd several oblong Seeds.

The Species are;

1. **SPIRÆA**; *salicis folio*. Tourn. *Spiræa Frutex*, vulgô.

2. **SPIRÆA**; *opuli folio*. Tourn. *Spiræa* with a Marsh-Elder Leaf, commonly called Virginian Gelder-Rose with a Currant Leaf.

3. **SPIRÆA**; *Hyperici folio non crenato*. Tourn. *Hypericum Frutex*, vulgô.

4. **SPIRÆA**; *Africana, odorata, foliis pilosis*. Com. Rar. Sweet-scented African *Spiræa* with hairy Leaves.

The first of these Shrubs is very common in the Nurseries near London, where it is sold with other flowering Shrubs at a certain Price by the Hundred. This Shrub seldom rises above five Feet high, so is proper to intermix with other Shrubs of the same Growth, in small Wilderness Quarters, and other Plantations of flowering Trees.

This Plant may be propagated from Suckers, which are sent forth in Plenty from the Stems of the old Plants, or by laying down the tender Branches, which, when rooted, should be transplanted out in Rows at three Feet distance, and the Plants a Foot asunder in the Rows: In this Nursery they may remain two Years, observing to keep the Ground clear from Weeds, and in the Spring to dig up the Ground between the Rows, so that their Roots may the more easily extend themselves; and if they shoot out many Side-branches, they should be prun'd off, so as to reduce the Shrubs to a regular Figure, and afterwards they may be transplanted where they are to remain, either in small Wilderness Quarters, or in Clumps of flowering Shrubs, observing to place them amongst other Sorts of equal Growth.

The second Sort is not quite so common in England as the former. This was originally brought from America, but it being full as hardy as the former, and increasing as fast by Suckers, it may soon be obtain'd in Plenty. This is nearly of the same Growth with the former, and may be intermixed therewith in Wilderness Quarters, to add to the Variety; it may be propagated and manag'd in the same Manner as the former.

The third Sort is very common in the Nurseries near London, where it is generally known by

by the Name of *Hypericum Frutex*, and is sold amongst other flowering Shrubs at a common Rate. This may be propagated by laying down the under Branches, which will take Root in the Compass of one Year, when they may be taken off, and planted in a Nursery for two or three Years (as hath been directed for the former) after which they may be transplanted out where they are design'd to remain, placing 'em with the two former, being nearly of the same Growth, where they will add to the Variety.

The two first Sorts do produce their Flowers at the Extremity of their Shoots, the first in a long Spike, and the second in Form of an Umbel, but the third Sort produces its Flowers at the Joints of the former Year's Wood, in Bunches, so that the whole Tree seems covered with white Flowers, when they are blown. They all three produce their Flowers in May, and sometimes continue in Beauty 'till June, in a cool Season, for which they are esteemed by the Curious.

These Shrubs do require no other Pruning but to cut out all the dead Branches, and such as grow irregular, and take off all their Suckers every Year, for if these are permitted to grow, they will starve the old Plants, by drawing away their Nourishment. The Ground between 'em should also be dug every Spring, to encourage their Roots, and every third Year a little rotten Dung buried therein, which will cause 'em to flower very strong.

The fourth Sort is a Native of the Cape of Good Hope, where the Inhabitants call it *Buchu*, and esteem it extremely for many medicinal Purposes, but particularly for expelling the Venom of Snakes.

This Plant is at present very rare in England, and I believe in most Parts of Europe, though formerly it was growing in several curious Gardens in Holland, but hath been lost in that Country for some Time, 'till two Years ago it was retrieved again from the Cape of Good Hope, by Mr. George Clifford of Amsterdam, a Gentleman who is extremely curious in Botany and Gardening, from whom I was furnish'd with it.

This Plant is propagated from Seeds, which should be sown upon a moderate Hot bed in the Spring, and when the Plants are come up, they must be transplanted each into a separate small Pot, fill'd with light, fresh Earth, and plung'd into a fresh Hot-bed, observing to water 'em and shade the Glasses in the Heat of the Day, until they have taken Root, after which they should have Air in proportion to the Heat of the Weather, and the Bed in which they are placed. In June they should be inured to the open Air by Degrees, and the Beginning of July they should be remov'd out of the Hot-bed, and placed in a warm Situation, where they may remain until the End of September, at which Time they must be removed into the Green-house, placing 'em in a warm Part, but not too close under other Plants. During the Winter Season they must be now and then gently refresh'd with Water, but they should not have it given them in

large Quantities at that Season; but in the Summer they do require to be water'd more plentifully; and at least once a Year they must be shifted into other Pots of a larger Size, as the Plants advance their Growth, giving 'em fresh Earth, which should be light and rich.

This Plant produces its Flowers near the extrem Parts of the Branches, which altho' not very beautiful, yet for the singular Appearance of the hairy Leaves, which adds to the Variety of exotick Plants in the Green-house, it deserves a Place in every curious Garden, especially as it requires no artificial Heat in Winter.

SQUASHES; *vide* Melo-pepo.

SQUILS; *vide* Scilla.

STACHYS, [of *σταχυς*, an Ear of Corn, because the Flowers of this Plant resemble an Ear of Corn.] Base-Horehound.

The Characters are;

It hath a labiated Flower consisting of one Leaf, whose Upper-lip is somewhat arch'd and erect, and the Under-lip is cut into three Segments, the middle one being larger than the other two; out of the Flower-cup rises the Pointal, attended by four Embryo's, which afterwards become so many Seeds, which are roundish, and inclos'd in a Husk, which before was the Flower-cup: To these Marks may be added, downy, hoary Leaves.

The Species are;

1. STACHYS; *major, Germanica*. C. B. P. Greater German Base-Horehound.

2. STACHYS; *Cretica*. C. B. P. Base-Horehound of Candia.

3. STACHYS; *Cretica, latifolia*. C. B. P. Broad-leav'd Base-Horehound of Candia.

4. STACHYS; *minor, Italica*. C. B. P. Lesser Italian Base-Horehound.

5. STACHYS; *Canariensis, frutescens, verbasci folio*. Tourn. Canary shrubby Base-Horehound, with a Mullein Leaf.

There are several other Species of this Plant which are preserv'd in some curious Botanick Gardens for Variety; but as they have little Beauty or Use, I shall not enumerate them here.

The four Sorts first-mentioned do seldom abide longer than two or three Years; for after they have produced Flowers and Seeds, the old Roots are very apt to decay, unless part of their Flower-stems are taken off early in the Summer, which will cause them to break out again at Bottom, whereby the Roots may be preserved.

They are all propagated by Seeds, which should be sown in March, upon a Bed of light, fresh Earth, and when the Plants are come up, they may be planted out into other Beds about six Inches asunder, observing to water 'em until they have taken Root, after which they will require no farther Care, but to keep 'em clear from Weeds, 'till Michaelmas, when they should be transplanted where they are to remain, which must be in an open Situation, and upon a dry, light Soil, not too rich, in which they will endure the Winter much

much better than in a rich, strong Soil. The *Summer* following these Plants will flower, and in *August* their Seeds will ripen, when they may be gathered and preserv'd 'till *Spring* for sowing.

The fifth Sort is a shrubby Plant, which with us rises to be six or seven Feet high; this is propagated by sowing the Seeds upon a Bed of light, fresh Earth (as the former) and when the Plants are come up, they must be transplanted into Pots fill'd with fresh, light, sandy Soil, placing 'em in a shady Situation until they have taken Root, after which they may be removed into a more open Exposure, but in dry Weather must be frequently watered: In this Place they may remain until the Middle or latter End of *October*, when they must be removed into the Green-house, placing them in the coolest part, where they may have as much free Air as possible, and must be often watered, otherwise they will soon decay.

In *Summer* Time these Plants will require to be shifted twice, adding fresh Earth to their Roots; and if they are only shelter'd from hard Frost in *Winter*, it will be sufficient, for they are very hardy. The second Year after sowing, they will produce Flowers and Seeds, and will continue so to do every Year after; and although their Flower has no great Beauty, yet, for the Variety of its large, soft, woolly Leaves, it deserves a Place amongst other exotick Plants.

STAMINA or CHIVES, are the small Threads which encompass the Style in the Center of Flowers, upon the Tops of which the Apices or Summits which contain the Male Dust hang.

STAMINEOUS FLOWERS, are such as have a Number of Stamina or Chives, but are destitute of the fine colour'd Leaves, which are called Petals, the Stamina being only encompassed by the Flower-cup; of this Class are *Nettles*, *Spinach*, *Hemp*, &c.

STAPHYLODENDRON, [so called of *σταφύλη*, a Grape, and *δένδρον*, a Tree, because its Fruit grows in Clusters] Bladder-nut.

The Characters are;

The Flower consists of several Leaves, which are placed circularly, and expand in Form of a Rose; out of whose many-leav'd Flower-cup rises the Pointal, which afterwards becomes a membranous Fruit, somewhat like the inflated Bladder of Fishes, and divided into two or three Cells, containing Seeds in Form of a Skull.

The Species are;

1. **STAPHYLODENDRON**; *sylvestre* & *vulgare*. *H. L.* The common wild Bladder nut.

2. **STAPHYLODENDRON**; *Virginianum trifoliatum*. *H. L.* Three-leav'd Virginian Bladder-nut.

3. **STAPHYLODENDRON**; *Africanum, folio singulari, lucido*. *Par. Bat.* African Bladder-nut with single shining Leaves.

The first of these Trees is found wild in the Woods and other shady Places near *Pon-*

tesraff in *Turkshire*, and in some other Northern Parts of *England*, but near *London* it is preserved in the Gardens of those who are curious in collecting the various Kinds of hardy Trees.

The second Sort is a Native of *America*, but is so hardy as to endure the severest Cold of our Climate in the open Air, and produces Flowers and Fruit as plentifully in *England* as the common wild Sort.

Both these Kinds may be propagated by sowing their Seeds early in the *Spring*, in Beds of light, fresh Earth, and when the Plants are come up, they must be carefully kept clear from Weeds, and in very dry Weather if they are now and then refresh'd with Water, it will greatly promote their Growth; in these Beds they may remain until *March* following, at which Time they should be carefully taken up and planted in a Nursery, placing 'em in Rows three Feet asunder, and the Plants eighteen Inches distance in the Rows; observing to lay a little Mulch upon the Surface of the Ground about their Roots to prevent the Sun and Wind from penetrating the Ground to dry them, and if the *Spring* should prove very dry, it will be convenient to give 'em a little Water, to encourage their taking Root; after which they will require no farther Care, but to keep the Ground clear from Weeds in *Summer*, and every *Spring* to prune off irregular Branches, and dig the Ground between the Rows, to loosen the Earth, that their Roots may the more easily extend. In this Nursery they may remain two or three Years, by which Time it will be proper to transplant them out where they are to remain, either in Wilderness Quarters or in Clumps of various Trees, where they will add to the Diversity. The best Season for transplanting these Trees is in the *Spring*, just before they begin to shoot, though they may be transplanted in *October* and *November*, as is practis'd for other deciduous Trees.

These do commonly grow in *England* to the Height of twelve or fourteen Feet, so should be plac'd with other Trees of the same Growth.

They may also be propagated by laying down their tender Branches, which will take Root in the Compass of one Year, and may afterwards be taken off and transplanted, as hath been directed for the Seedling Plants.

The *African* Sort does not produce Seeds in this Country, as I could ever observe; so is only propagated by laying down the tender Branches in the *Spring*, observing to notch 'em at a Joint, as is practis'd in laying down Carnations. These, if duly watered in dry Weather, will take Root in the Compass of one Year, and may the succeeding *Spring* be taken off, and transplanted into Pots, fill'd with light, fresh, rich Earth, and placed in a shady Part of the Green-house, until they have taken Root, and in *May* they should be carried into the open Air, placing 'em amongst other exotick Plants, in a warm Situation. During the *Summer* Season they must be frequently watered, and when their Roots have fill'd the Pots,

Pots, they should be removed into larger, observing always in shifting these Plants, to pare off the Earth and Fibres on the Outside of the Ball, before they are placed into the other Pots, which must also be filled up with the same light rich Earth as before directed. In *Winter* they must be housed with *Oranges*, *Myrtles*, &c. being too tender to endure the Cold of our Climate in the open Air, but do require no artificial Warmth in *Winter*; and though the Flowers of this Tree (which it often produces in *England*) are not very beautiful, yet as it retains its Leaves all the *Winter*, which have a very shining Appearance, when the Trees are train'd up to regular Heads, it adds greatly to the Beauty of a Green-house, when intermix'd with exotick Plants, and deserves a Place in every good Collection.

STAR-WORT ; *vide* After.

STAR-FLOWER ; *vide* Ornithogalum.

STATICE ; Thrift or Sea Pink.

The Characters are ;

It is a Plant with a Flower gathered into an almost spherical Head, furnish'd with a common scaly Empalement. This Head is composed of several Clove-Gilly-flower Flowers, consisting of several Leaves in a proper Empalement, shap'd like a Funnel. In like manner the Pointal rises out of the same Empalement, and afterwards turns to an oblong Seed, wrapt up in the Empalement as in a Husk.

The Species are ;

1. STATICE ; *Lugd.* Thrift, Sea-Gilly-flower or Sea-Cushion.

2. STATICE ; *montana, minor.* Tourn. Lesser Mountain Thrift or Sea-Gillyflower.

3. STATICE ; *foliis angustioribus, flore rubro.* Boerb. Ind. Narrow-leav'd Thrift with red Flowers.

4. STATICE ; *foliis angustioribus, flore albo.* Boerb. Ind. Narrow-leav'd Thrift with a white Flower.

5. STATICE ; *Lusitanica, fruticosa maritima, magno flore.* Tourn. Shrubby Portugal Sea Thrift with a large Flower.

The first of these Plants grows wild in *Germany*, and some other Inland Countries in great Plenty, from whence it hath been brought into *England*; but the second Sort is found wild in great Plenty in the Salt Marshes near the Sea, in divers Parts of *England*.

The third and fourth Sorts have been brought into *England* from the *Alps*, or some other mountainous Parts, and are preserv'd for the Beauty of their Flowers in some old Gardens.

The fifth Sort is less common in *England* than either of the former Sorts, and is only to be found in the Gardens of such as are curious in collecting rare Plants.

The first four Sorts have been promiscuously planted in Gardens, to make Edgings on the Sides of Borders in the Flower-gardens, for which Purpose they were formerly in great Esteem, but of late they have been

very justly rejected for that Use, because there was a Necessity of transplanting these Edgings every Year, otherwise they could not be kept within due Bounds; besides, where-ever a Plant fail'd, which was no extraordinary thing, there always appear'd a large unsightly Gap. However, though they are not in use at present for that Purpose, yet a few Plants of the first, third, fourth, and fifth Sorts should have a Place in some Part of the Flower-Garden, for Variety, especially the third and fourth, which are extreme hardy Plants, and will grow in almost any Soil or Situation, and their Flowers will continue a long Time in Beauty.

All these Sorts may be propagated by parting their Roots, the best Time for which is in *Autumn*, that they may take Root before the Frost, which will cause 'em to flower much stronger than those transplanted in the *Spring*, and the Plants will not be in so much Danger of miscarrying as those are, especially when the *Spring* happens to prove dry. After these Plants have taken Root, they will require no farther Care, but to keep them clear from Weeds, and the *May* following they will begin to flower, which will continue in Beauty three Weeks or a Month, provided the Season be not too hot and dry.

The *Portugal* Sort is not so hardy as either of the former, tho' it will endure the Cold of our ordinary *Winters* very well in the open Air, provided it is planted in a dry Soil and a warm Situation, but in very severe Frosts it is often destroy'd. This may also be propagated by Cuttings or Slips, which should be planted in a Bed of fresh Earth in the *Spring*, and water'd and shaded until they have taken Root; after which they must be kept clear from Weeds till *Michaelmas*, when they should be planted either into Pots to be shelter'd in *Winter*, or in some warm Situation in the full Ground, where they may remain to flower.

This Plant will grow two or three Feet high, and become shrubby, provided it be not injur'd by Cold.

STATUES and VASES contribute very much to the Embellishment and Magnificence of a Garden, and extremely advance the natural Beauties of it.

They are made of several Forms and different Materials; the richest are those of Cast Brass, Lead gilt, and Marble; the ordinary Sort are of common Stone or *Stucco*.

Among Figures are distinguish'd Groups, which consist at least of two Figures together in the same Block; Figures insulate or detach'd, that is, those that you can go quite round; and Figures that are set in Niches, which are furnish'd on the fore Part only.

There are likewise Busts, Termes, half-length Figures, Figures half as big as the Life, and those bigger than the Life that are call'd *Colossal*, either on regular Pedestals, or such as are more slender, tapering, and hollow'd, not to mention the Figures which sometimes adorn Cascades; as do also *Bass Relievs* and Mash Heads.

These

These Figures represent all the several Deities, and illustrious Persons of Antiquity, which should be placed properly in Gardens.

The River Gods, as *Naiades*, *Rivers*, and *Tritons*, should be placed in the Middle of Fountains and Basons.

The Gods of the Woods, as *Sylvans*, *Fauns*, and *Dryades*, in the Groves; *Sacrifices*, *Bacchanals*, and Childrens Sports are likewise represented in *Bass Relievo* upon the *Vases* and *Pedestals*, which may be adorn'd with Festoons, Foliage, Mouldings, and other Ornaments.

Figures and *Vases* are usually set along the Palisades in the Front, and upon the Sides of a Parterre, in the Niches and Sinking of Horn-beam or of Lattice-work made for that Purpose.

They are placed in Groves in the Center of a Star or St. *Andrew's Cross*, in the Spaces between the Walls of a Goose-foot in the Middle of Halls and Cabinets, among the Trees and Arches of a green Gallery, and at the Head of a Row of Trees or Palisades that stand free or detach'd.

In Woods and Groves, *Sylvanus*, God, and *Ferona*, Goddess of the Woods; *Aleon* the Hunter, who chancing to espy *Diana* bathing, she transform'd him into a Hart, and he was devour'd by his own Dogs: Also,

Ecebo, a Virgin rejected of her Lover, who pined away in the Woods for Grief, where her Voice still remains, answering the Outcries of every Complaint: Also,

Philomela transform'd into a *Nightingale*, and *Iris* into a *Pheasant*.

They are also placed at the lower Ends of Walks and Vista's, to set them off the better.

Jupiter, *Mars*, and *Bellona* should possess the largest open Centers and Lawns of a grand Design, elevated upon Pedestals, columnal and other architectonical Works, with their immediate Servants and Vassals underneath, *Jupiter* with his *Mercury*, *Mars* with *Fame*, and the rest of their Attendants.

Also *Minerva* and *Pallas*, Goddesses of Wisdom, with the seven liberal Sciences; the three Destinies, *Clotbo*, *Lachesis*, and *Atropos*; *Tellus* the God of the Earth; *Priapus* the God of Gardens; *Pytho* the Goddess of Eloquence, *Vesta* the Goddess of Chastity.

Neptune in his Chariot should possess the Center of the greatest Body of Water, whether it be Fountain, Bason, or whatsoever of that Kind, and attended with the *Naiades*, *Tritons*, and his other Sea Attendants.

For Canals, Basons, and Fish-ponds, *Palemon*, *Paniscus*, and *Oceanus*, Gods; *Dione*, *Melicerta*, *Thetis*, and *Marica*, Sea-Goddesses; *Salacia*, Goddess of the Water; *Naiades*, Fairies of the Water; and the Syrens, *Parthenope*, *Lygia*, and *Leusia*.

Venus should be placed among the Graces, *Agliaia*, *Ithalia*, and *Euphrosyne*; *Cupid*, &c.

It may also be proper to place *Apollo* with the *Muses*, *Clio*, *Melpomene*, *Ithalia*, *Euterpe*, *Terpsichore*, *Erato*, *Calliope*, *Urania*, and *Polyhymnia*, in the Niches; and *Minerva* with the Liberal Sciences, &c. and in all the lesser Centers of a Polygonal Circumscription.

Flora and *Cloris*, Goddesses of Flowets, and also *Venus*, *Daphne*, and *Rucina* the Goddess of Weeding, in the Flower-Garden.

The *Dii Minores* ought also to possess the Niches.

Vulcan with the *Cyclops* in a Center of less Note; and all the rest of the Deities in their particular Places and Order.

Ceres and *Pomona*, and the three *Hesperides*, *Eagle* and *Hesperathusa*, who were three Sisters; feign'd to have an Orchard of Golden Apples, kept by a Dragon, which *Hercules* slew, when he took them away, should be placed in the Orchard: The *Fauns* and *Sylvans* should be placed in the more remote and rural Centers and Parts of the Wood-work.

Bacchus, the God of Wine, and *Silenus*, in Vineyards.

Daphne and *Diana*, *Flora* and *Venus*, should have their Places in the Flower-Garden.

Aeolus, God of the Winds, and the *Oreades*, Fairies of the Mountains, should be placed on high Mounts, Terras Walks, &c.

The Goddess *Vallenta* in Vallies.

Harpocrates and *Angerona*, the former the God, and the latter the Goddess of Silence, and *Mercury* the God of Eloquence, in private Cabinets in a Wilderness or Grove.

Comus, the God of Banquetting, in Places for that Purpose.

Aristaus, the Patron of Bees, near an Aviary.

Morpheus and *Pan*, Gods of Sheep, *Pales* the Goddess of Shepherds, and *Bubona* the Goddess of Oxen, in small Paddocks of Sheep in a Wilderness.

Robigus, a God who preserv'd Corn from being blasted, *Ceres* the Goddess of Bread Corn, and *Tutelina* a Goddess, who had the Tutition of Corn in the Fields, in small Enclosures for Corn in a Wilderness.

STELLATE Plants, are such as have their Leaves placed at certain Intervals of the Stalks in Form of a Star; of this Tribe are *Madder*, *Goose-Grass*, *Ladies Bedstraw*, &c.

STERILITY signifies Barrenness.

STOCK-GILLY-FLOWER; vide *Leucojum*.

STOECHAS; [so call'd of certain Isles in the Mediterranean Sea, by the French, where this Plant was first found. In the Shops it is call'd *Stachas Arabica*, not because it grows there, but because the Arabian Physicians do highly commend this Herb.] *Cassidony*, French *Lavender*, or *Stickadore*.

The Characters are;

It hath a labiated Flower consisting of one Leaf, whose upper Lip is upright, and cut in two, but the under Lip (or Beard) is cut into three Parts; but both are so divided as at first to appear like a Flower cut into five Segments; out of whose Flower-cup rises the Pointal, attended by four Embryo's, which afterwards becomes so many roundish Seeds inclosed in the Flower-cup. To these Marks must be added,

that the Flowers are ranged in a various Series into scaly Heads, out of the Top of which peep some small Leaves, which look very beautifully.

The Species are;

1. STOECHAS; *purpurea*. C. B. P. Purple *Stachas* or *Cassidony*, commonly call'd, Arabian *Stachas*.

2. STOECHAS; *folio serrato*. C. B. P. *Cassidony*, or French Lavender, with a serrated Leaf.

3. STOECHAS; *cauliculis non foliatis*. C. B. P. *Cassidony*, or French Lavender, with long naked Flower-stalks.

The Heads of Flowers of the first Kind are used in some of the capital Medicines directed by the College of Physicians, which are commonly brought from the South Parts of France, where the Plants are in great Plenty; but these are very apt to take a Mouldiness in their Passage, and so are not near so good for use as those which are gather'd fresh in England, where the Plants may be cultivated to great Advantage.

The second and third Sorts are preserv'd in many curious Gardens for Variety, but they are not of any use.

All these Plants may be cultivated by sowing their Seeds upon a Bed of light, dry Soil in March; and when the Plants are come up, they should be carefully clear'd from Weeds until they are two Inches high, at which time they should be remov'd; therefore there must be a Spot of light, dry Ground prepar'd, and laid level, which must be trodden out in Beds, into which the Plants should be planted at about five or six Inches Distance each Way, observing to water and shade them until they have taken Root, after which they will require no further Care, but to keep them clear from Weeds the following Summer; but if the Winter should prove very severe, it will be proper to cover them with Mats, *Pease-baulm*, or some other light Covering to guard them against the Frost, which otherwise would be apt to injure them while they are so young: But in March, or the Beginning of April, the following Spring, they must be remov'd into the Places where they are to remain, observing, if possible, to transplant them in a warm, moist Season, and not to let them remain long above Ground, for if their Roots are dry'd, they seldom grow well after. The Soil in which these are planted should be a dry, warm Sand or Gravel, and the poorer the Soil is in which they are planted, the better they will endure the Cold of the Winter, provided the Ground be dry; tho' indeed the Plants will thrive better in Summer upon a rich, moist Ground; but then they will not produce so many Flowers, nor will the Plant afford near so strong an aromattick Scent; as is the Case with most Sorts of aromattick Plants.

These Plants may also be propagated by planting Slips or Cuttings of any of the Kinds in the Spring, observing to refresh them with Water until they have taken Root, after which they may be manag'd as hath been directed for the seedling Plants; but as those Plants

rais'd from Seeds are much better than these, it is hardly worth while to propagate them this way, especially since their Seeds do ripen so well in this Country.

The Heads of the first Sorts may be gather'd for use when the Flowers are in full Perfection, and spread to dry in a shady Place, after which they may be put up for use.

STONECROP; *vide* *Sedum*.

STONECROP-TREE; *vide* *Vermicularis Frutex*.

STOVES are Contrivances for the preserving such tender Exotick Plants, which will not live in these Northern Countries without artificial Warmth in Winter. These are built in different Methods, according to the Ingenuity of the Artist, or the different Purposes for which they are intended; but in England they are at present reducible to two.

The first is call'd a *Dry Stove*, being so contriv'd, that the Flues thro' which the Smoak passes are either carry'd under the Pavement of the Floor, or else are erected in the Back-part of the House, over each other, like Steps: In these *Stoves* the Plants are placed on Shelves of Boards laid on a Scaffold above each other, for the greater Advantage of their standing in Sight, and enjoying an equal Share of Light and Air. In these *Stoves* are commonly placed the tender Sorts of *Aloes*, *Cereus's*, *Euphorbiums*, *Tibymals*, and other succulent Plants, which are impatient of Moisture in Winter, and therefore require to be kept in a separate *Stove*, and not placed among Trees or herbaceous Plants, which perspire freely, and thereby often cause a damp Air in the House, which is often imbib'd by the succulent Plants to their no small Prejudice. These *Stoves* may be regulated by a *Thermometer*, so as not to over-heat them, nor to let the Plants suffer by Cold; in order to which, all such Plants as require nearly the same Degree of Heat should be placed by themselves in a separate House; for if in the same *Stove* there are Plants placed of many different Countries, which require as many different Heats, by making the House warm enough for some Plants, others by having too much Heat, are drawn and spoil'd.

The other Sort of *Stoves* are commonly call'd *Bark-Stoves*, to distinguish them from the *Dry-Stoves* already mention'd. These have a large Pit, nearly the Length of the House, three Feet deep, and six or seven Feet wide, according to the Breadth of the House; which Pit is fill'd with fresh *Tanners-Bark* to make a Hot-bed, and in this Bed the Pots of the most tender Exotick Trees and Herbaceous Plants are plung'd; the Heat of this Bed being moderate, the Roots of the Plants are always kept in Action, and the Moisture detain'd by the Bark keeps the Fibres of their Roots in a ductile State, which in the *Dry-Stove*, where they are placed on Shelves, are subject to dry too fast, to the great Injury of the Plants. In these *Stoves* (if they are rightly contriv'd)

may

may be preserv'd the most tender Exotick Trees and Plants, which, before the Use of the Bark was introduced, were thought impossible to be kept in *England*: But as there is some Skill requir'd in the Structure of both these *Stoves*, I shall not only describe them as intelligibly as possible, but also annex a Plan of the *Bark-Stove* hereto, by which it is hoped every curious Person will be capable of directing their Workmen in their Structure.

The Dimension of this *Stove* should be proportion'd to the Number of Plants intended to be preserv'd, or the particular Fancy of the Owner; but their Length should not exceed forty Feet, unless there are two Fire-places, and in that case it will be proper to make a Partition of Glass in the Middle, and to have two Tan-pits, that there may be two different Heats, for Plants from different Countries (for the Reasons before given in the Account of *Dry-Stoves*); and were I to erect a Range of *Stoves*, they should be all built in one, and only divided with Glass Partitions, which will be of great Advantage to the Plants, because they may have the Air in each Division shifted by sliding the Glasses of the Partitions, or by opening the Glass-door, which should be made between each Division, for the more easy Passage from one to the other.

This *Stove* should be rais'd above the Level of the Ground, in proportion to the Dryness of the Place; for if it be built on a moist Situation, the whole should be placed upon the Top of the Ground; so that the Brick-work in Front must be rais'd three Feet above the Surface, which is the Depth of the *Bark-bed*, whereby none of the *Bark* will be in Danger of lying in Water: but if the Soil be dry, the Brick-work in Front need not be more than one Foot above Ground, and the Pit may be sunk two Feet below the Surface. Upon the Top of this Brick-work in Front must be laid the Plate of Timber, into which the Wood-work of the Frame is to be fasten'd, and the upright Timbers in Front must be placed four Feet asunder or somewhat more, which is the Proportion of the Width of the Glass-doors or Sashes; these should be about six Feet and a half or seven Feet long, and plac'd upright; but from the Top of these should be sloping Glasses, which should reach within three Feet of the Back of the *Stove*, where there should be a strong Crown-piece of Timber placed, in which there should be a Groove made for the Glasses to slide into. The Wall in the Back-part of the *Stove* should be thirteen Inches thick, and carry'd up about nine Feet above the Surface of the *Bark-bed*; and from the Top of this Wall there should be a sloping Roof to the Crown-piece where the Glasses slide in. This Crown-piece should be about sixteen Feet high from the Surface of the *Bark-bed* or Floor, which will give a sufficient Declivity to the sloping Glasses to carry off the Wet, and be of a reasonable Height for to contain many tall Plants. The Back-roof may be slated, cover'd with Lead, or tiled, according to the Fancy of the Owner: But

the manner of this outside Building is better express'd by the annex'd Plan, than is possible to be describ'd in Words.

In the Front of the House there should be a Walk about twenty Inches wide, for the Conveniency of walking, next to which the *Bark-pit* must be plac'd, which should be in Width proportionable to the Breadth of the House: If the House is twelve Feet wide, which is a due Proportion, the Pit may be seven Feet wide; and behind the Pit should be a Walk eighteen Inches wide, to pass in order to water the Plants, &c. then there will be twenty-two Inches left next the Back-Wall to erect the Flues, which must be all rais'd above the Top of the *Bark-bed*; these Flues ought to be sixteen Inches wide in the Clear, that they may not be too soon stopped with the Soot; and the lower Flue, into which the Smoak first enters from the Fire, should be two Feet deep in the Clear, and this may be cover'd either with Cast Iron Plates or broad Tiles; over this the second Flue must be return'd back again, which may be eighteen Inches deep, and cover'd on the Top as before; and so in like manner the Flues may be return'd over each other three or four times, that the Heat may be spent before the Smoak passes off. The Thickness of the Wall in Front of these Flues need not be more than four Inches, but must be well jointed with Mortar, and plaster'd within-side to prevent the Smoak from getting into the House, and the Outside should be faced with Mortar, and cover'd with a coarse Cloth, to keep the Mortar from cracking, as is practis'd in setting up Coppers; if this be carefully done, there will be no Danger of the Smoak entering the House, which can't be too carefully avoided; for there is nothing more injurious to Plants than Smoak, which will cause them to drop their Leaves, and if it continue long in the House, will intirely destroy 'em.

The Fire-place may be made either at one End or in the Middle, according as there is most Conveniency, for where-ever it is plac'd, it should have a Shed over it, and not be expos'd to the open Air; for it will be impossible to make the Fire burn equally, where the Wind has full Egress to it, and it will be troublesome to attend the Fire in wet Weather, where it is expos'd to the Rain.

The Contrivance of the Furnace must be according to the Fuel which is design'd to burn; but as Turf is the best Firing for *Stoves*, where it can be had, because it burns more moderately, and lasts longer than any other Sort of Fuel, and so requires lesser Attendance, I shall describe a proper Sort of Furnace for that Purpose.

The whole of this Furnace should be erected within the House, which will be a great Addition to the Heat, and the front Wall on the Outside of the Fire-place, next the Shed, should be two Bricks thick, the better to prevent the Heat from coming out that Way. The Door of the Furnace, at which the Fuel is put in, must be as small as conveniently may be to admit of the Fuel; and this Door should

should be plac'd near the upper Part of the Furnace, and made to shut as close as possible, so that there may but little of the Heat pass off thro' it. This Furnace should be about twenty Inches deep, and twenty Inches square at Bottom, but may be stop'd off on every Side, so as to be two Feet square at the Top; and under this Furnace should be a Place for the Ashes to fall into, which should be about a Foot deep, and as wide as the Bottom of the Furnace; this should also have an Iron Door to shut as close as possible; but just over the Ash-Hole, above the Bars which support the Fuel, should be a square Hole about four Inches wide, to let in Air to make the Fire burn; this must also have an Iron Frame, and a Door to shut close when the Fire is perfectly lighted, which will make the Fuel last the longer, and the Heat will be more moderate.

The Top of this Furnace should be nearly equal to the Top of the Bark-bed, that the lowest Flue may be above the Fire, so that there may be a greater Draught for the Smoak, and the Furnace should be cover'd with a large Iron Plate, closely cemented to the Brick-work, to prevent the Smoak from getting out; And you should be very careful, where-ever the Fire is plac'd, that it be not too near the Bark-bed; for the Heat of the Fire will, by its long Continuance, dry the Bark, so that it will lose its Virtue, and be in Danger of taking Fire; to prevent which, it will be the best Method to continue a Hollow between the Brick-work of the Fire and that of the Pit, about eighteen Inches wide, which will effectually prevent any Damage arising from the Heat of the Fire; and there should be no Wood-work plac'd any where near the Flues or the Fire-place, because the continual Heat of the Stove may in time dry it so much as to cause it to take Fire, which ought to be very carefully guarded against.

The Entrance into this Stove should be either from a Greenhouse, the dry Stove, or else thro' the Shed where the Fire is made, because in cold Weather the Front Glasses must not be open'd. The Inside of the House should be clean white-washed, because the whiter the Back-part of the House is, the better it will reflect the Light, which is of great Consequence to Plants, especially in Winter, when the Stove is oblig'd to be shut up close.

Over the Top Sliding-Glasses there should be either wooden Shutters, or Tarpawlines to roll down over them in bad Weather, to prevent the Wet from getting thro' the Glasses, and to secure them from being broke by Storms of Hail, and these outer Coverings will be very serviceable to keep out the Frost; and if in very severe Cold there is a Tarpawlin hung before the upright Glasses in the Front, it will be of great Service to the Stove, and a much less Fire will preserve a Heat in the House.

In the warmest of these Houses or Divisions should be plac'd the most tender Exotick Trees and Plants, a List of which is as followeth:

<i>Acajou or Cashew,</i>	<i>Fig Tree, the Arched</i>
<i>Allegator Pear,</i>	<i>Indian,</i>
<i>Allspice or Pimento,</i>	<i>Flower-fence of Bar-</i>
<i>Arrow Root,</i>	<i>badoes,</i>
<i>Bananas,</i>	<i>Fustick Tree,</i>
<i>Bastard Cedar of Bar-</i>	<i>Ginger,</i>
<i>badoes,</i>	<i>Guajacum,</i>
<i>Bastard Locust of Bar-</i>	<i>Guayava Tree,</i>
<i>badoes,</i>	<i>Logwood,</i>
<i>Bully Tree,</i>	<i>Macaw Tree,</i>
<i>Button Wood of Bar-</i>	<i>Mamee Tree,</i>
<i>badoes,</i>	<i>Mancinel Tree,</i>
<i>Cabbage Tree,</i>	<i>Mimosa or Sensitive</i>
<i>Cocoa Tree,</i>	<i>Plants,</i>
<i>Calibash Tree,</i>	<i>Nickar Tree or Bonduc,</i>
<i>Cassada,</i>	<i>Palm Trees of several</i>
<i>Cassia Fistula,</i>	<i>Sorts,</i>
<i>Cedar Tree of Barba-</i>	<i>Papaw Tree,</i>
<i>does,</i>	<i>Plantane Tree,</i>
<i>Cherry Tree of Barba-</i>	<i>Plum Tree of Jamaica,</i>
<i>does,</i>	<i>Sapotilla Tree,</i>
<i>Cocoa-nut Tree,</i>	<i>Sope Berry Tree,</i>
<i>Cortex Winteranus,</i>	<i>Sowre Sop,</i>
<i>Custard Apple,</i>	<i>Sugar Apple,</i>
<i>Date Tree,</i>	<i>Sweet Sop,</i>
<i>Dumb Cane,</i>	<i>Tamarind Tree,</i>
<i>Fiddle wood,</i>	<i>Tulip Flower or White-</i>
	<i>wood.</i>

These, with most other Sorts of Trees, Shrubs, and Herbaceous Plants, should be plung'd in the Bark-bed for the Reasons already assign'd; and upon the Top of the Flues may be set the *Anana* or *Pine-Apple* Plants in Winter, as also the *Melon-Thistle*, the tender Sorts of *Cereus's*, and *Euphorbiums*, with other very tender succulent Plants, which require to be kept dry in Winter.

As in this Stove are plac'd the Plants of the hottest Parts of the *East* and *West-Indies*, so the Heat should be kept up equal to that mark'd *Anana* upon Mr. *Fowler's Thermometers*, and should never be suffered to be above eight or ten Degrees cooler at most, nor should the Spirit be rais'd above ten Degrees higher in the Thermometer; both which Extreams will be equally injurious to the Plants.

But in order to judge more exactly of the Temper of the Air in the Stove, the Thermometer should be hung up at a good Distance from the Fire, nor should the Tube be expos'd to the Sun, but on the contrary, the Back hung thereto, because whenever the Sun shines upon the Ball of the Thermometer but one single Hour, it will raise the Liquor in the Tube considerably, when perhaps the Air of the House is not near so warm; which many times deceives those who are not aware of this.

In the Management of the Plants placed in the Bark-bed, there must be a particular Regard had to the Temper of the Bark and the Air of the House, that neither be too violent; as also to water 'em frequently, because when they are in a continual Warmth, which will cause 'em to perspire freely, if they have not a constant Supply to answer their Discharge,

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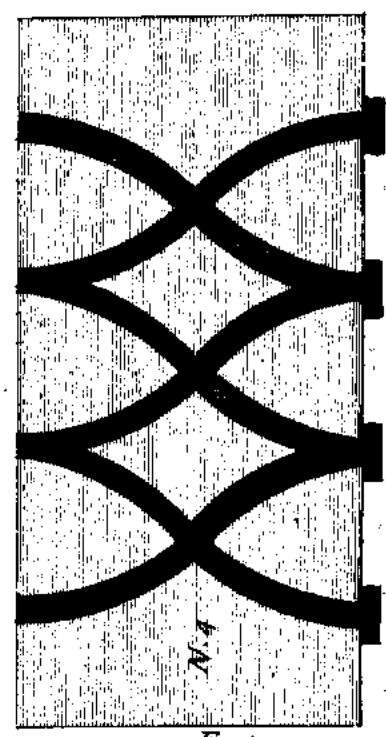
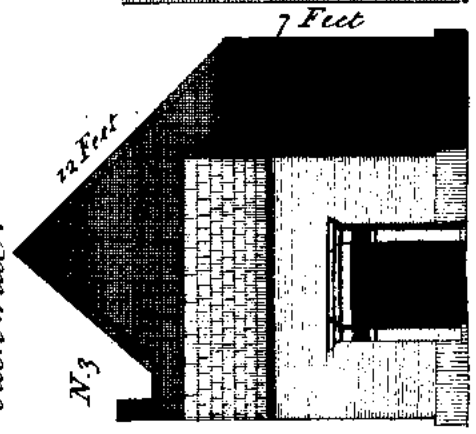
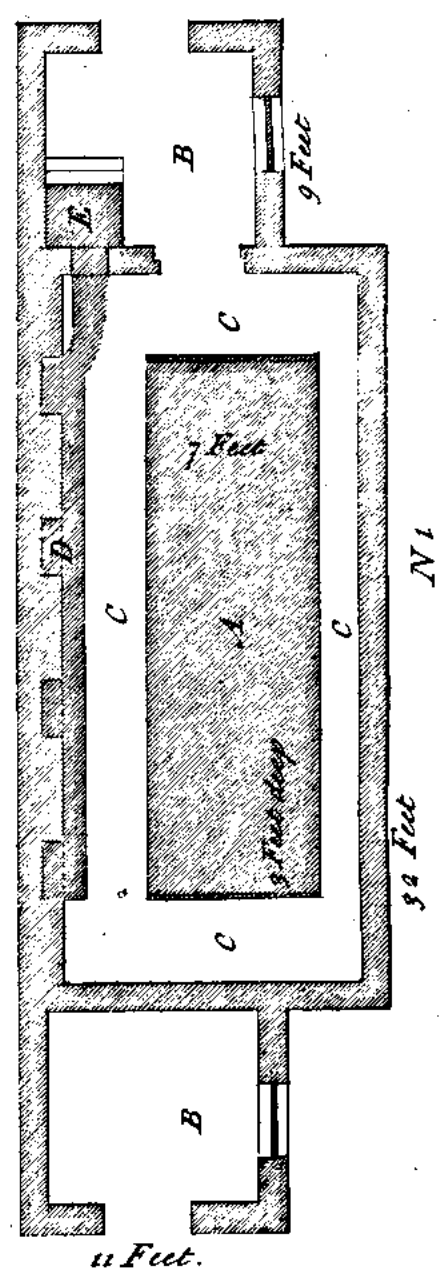
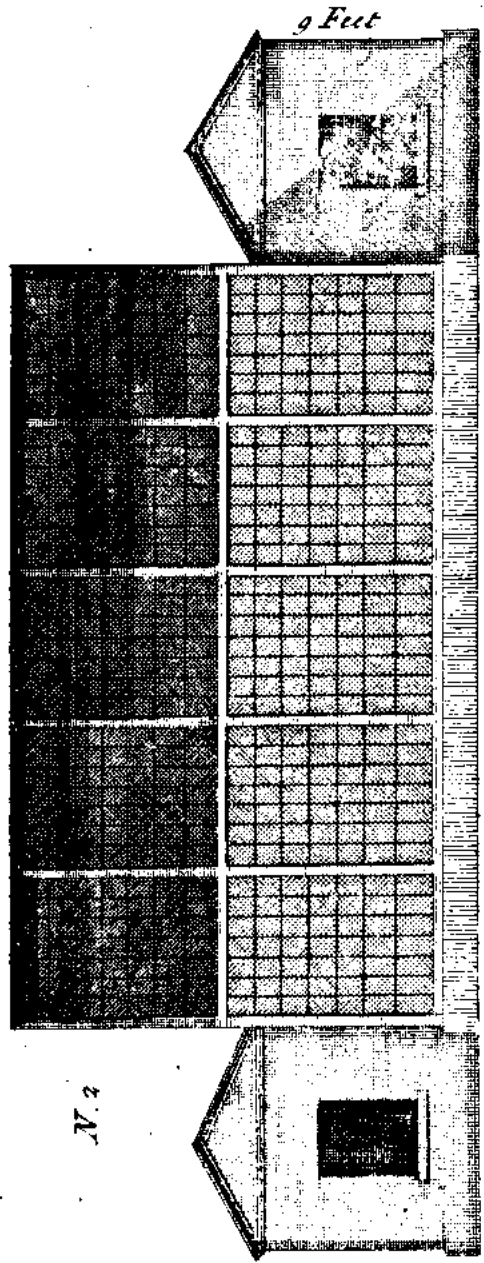
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A Plan of the Stove.

An Explanation of the Draught.

- N. 1. Is the Plan.
- N. 2. Is the Elevation of the Front.
- A. The pit for the Bars.
- N. 3. Is the Elevation of one end w^{ch} shews the Slope of y^e Glass and the Angle which it makes with the Front.
- B. Sheds at each end, one where y^e Fire is kept, y^e other for a Stool house in order to make the draught uniform.
- N. 4. Is the Section of y^e back Wall which shews how all the Flues may be laid into each other for the equal distributioⁿ of the Heat.
- C. The distance from y^e Bartopit to the inside Wall.
- D. The Funnel that comes from E. where y^e Fire is kept which passes thro' all the Flues in the back Wall.



T. Rogers Del.

Price this at 2.9999999

charge, their Leaves will decay, and soon fall off. As to the farther Directions concerning the Culture of the particular Plants, the Reader is desir'd to turn to their several Articles, where they are distinctly treated of.

The other Sort of *Stove*, which is commonly call'd the *Dry Stove* (as was before said) may be either built with upright and sloping Glasses at the Top, in the same Manner, and after the same Model of the *Bark-stove*; or else the front Glasses, which should run from the Floor to the Ceiling, may be laid sloping, to an Angle of 45 Degrees, the better to admit the Rays of the Sun in *Spring* and *Autumn*: The latter Method has been chiefly follow'd by most Persons who have built these Sort of *Stoves*; but were I to have the Contrivance of a *Stove* of this kind, I would have it built after the Model of the *Bark-Stove*, with upright Glasses in Front, and sloping Glasses over them, because this will more easily admit the Sun at all the different Seasons; for in *Summer*, when the Sun is high, the Top Glasses will admit the Rays to shine almost all over the House; and in *Winter*, when the Sun is low, the Front Glasses will admit its Rays; whereas when the Glasses are laid to any Declivity in one Direction, the Rays of the Sun will not fall directly thereon above a Fortnight in *Autumn*, and about the same Time in *Spring*, and during the other Parts of the Year they will fall obliquely thereon, and in *Summer*, when the Sun is high, the Rays will not reach above five or six Feet from the Glasses; for the Proof of this see the Article *Sun*. Besides, the Plants plac'd toward the Back-part of the House will not thrive in the *Summer* Season for want of Air, whereas when there are sloping Glasses at the Top, which run within four Feet of the Back of the House, these, by being drawn down in hot Weather, will let in perpendicular Air to all the Plants; and of how much Service this is to all Sorts of Plants, every one who has had Opportunity of observing the Growth of Plants in a *Stove*, will easily judge: For when Plants are plac'd under Cover of a Ceiling, they always turn themselves toward the Air and Light, and thereby grow crooked; and if in order to preserve them strait, they are turn'd every Week, they will nevertheless grow weak, and look pale and sickly, like a Person shut up in a Dungeon; for which Reasons I am sure whoever has made Trial of both Sorts of *Stoves*, will readily join with me to recommend the Model of the *Bark-Stove* for every Purpose.

As to the farther Contrivance of this *Stove*, it will be necessary to observe the Temper of the Place, whether the Situation be dry or wet; if it be dry, then the Floor need not be rais'd above two Feet above the Level of the Ground; but if it be wet, it will be proper to raise it three Feet, because as these Flues are to be carry'd under the Floor, so when they are made under, or close upon the Surface of the Ground, they will raise a Damp, nor will the Flues draw so well as when they are more elevated. The Furnace of this *Stove*

may be either plac'd at one End of the House, or at the Back-part thereof, according to the Conveniency of the Building. This must be made according to the Fuel intended to burn, which, if for Coals or Wood, may be made according to the common Method for Coppers, but only much larger, because as the Fire is to be continu'd in the Night chiefly, so if there is not Room to contain a great Quantity of Fuel, it will occasion a great deal of Trouble in tending upon the Fire in the Night, which should be avoided as much as possible, because whenever the Trouble is made very great or difficult, and the Person who is intrusted with the Care of it has not a very great Affection for the Thing, and is withal not very careful, there will be great Hazard of the Fire being neglected, which in a little time would be of dangerous Consequence to the Plants: But if the Fuel intended be Turf, then the Contrivance of the Furnace may be the same as for the *Bark-Stove* already mention'd. The Flues of this *Stove* should be turn'd in Angles after the following Manner;



which will cause them to draw better than if strait, and by this Method of disposing them, they will reach from the Back to the Front of the House.

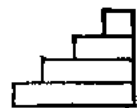
The Depth of them should not be less than eighteen Inches, and the Width nearly equal, which will prevent their being choak'd up with Soot, as is often the Case when the Flues are made too small. The Spaces between the Flues should be fill'd up either with dry Brick Rubbish, Lime, or Sand, from which there will little Moisture arise; and the Flues should be closely plaister'd with Loam both within and without, and the upper Part of them cover'd with a coarse Cloth under the Floor, to prevent the Smoak from getting into the House.

When the Flue is carry'd from the Furnace to the End of the House, it may be return'd in the Back above the Floor in a strait Line, which may be contriv'd to appear like a Step or two, by which Means the Smoak will be continu'd in the House until all its Heat is spent, which will consequently warm the Air of the House the better; and the Chimnies thro' which the Smoak is to pass off, may be either at both Ends or in the Middle, carry'd up in the Thickness of the Brick work of the Walls, so as not to appear in Sight; the Flues should be first cover'd either with Iron Plates or broad Tiles, and then a Bed of Sand over them about two Inches thick, upon which the plain Tiles should be laid to correspond with the rest of the Floor. This Thickness of Cover will be full enough to prevent the too sudden Rise of the Heat from the Flues.

But if the Furnace is plac'd under the Floor, the Thickness of Sand between the Iron Plate which covers it and the Floor, should not be less than four Inches, so that the Bottom of the Furnace should be sunk the lower; and if

from the Fire-place to the End of the House, the Flues are laid a little rising, it will cause them to draw the better; but this Rise must be allowed in the placing them lower under the Floor next the Fire, because the Floor must be laid perfectly level, otherwise it will appear unsightly.

In this *Stove* there should be a Stand or Scaffold erected for placing Shelves above each other in the Manner annex'd, that the Plants may be dispos'd above each other, so as to make a handsome Appearance in the House; but these Shelves should be made moveable, so as to be rais'd or sunk, according to the various Heights of the Plants, otherwise it will be very troublesome to raise or sink every particular Plant according to their Heights, or every Year as they advance.



In placing the Feet of this Stand, you must be careful not to set them too near the Fire, nor directly upon the Top of the Flue, (especially at that End next the Fire) lest by the constant Heat of the Tiles the Wood should take Fire, which can't be too much guarded against, since such an Accident would go near to destroy all the Plants, if the House escap'd being burnt. This Stand or Scaffold should be plac'd in the Middle of the House, leaving a Passage about two Feet and an half in the Front, and another of the same Width in the Back, for the more conveniently passing round the Plants to water them, and that the Air may freely circulate about them. In disposing the Plants, the tallest should be plac'd backward, and the smallest in Front, so that there will not be Occasion for more than five or six Shelves in Height at most; but the Scaffold should be so contriv'd, that there may be two or three Shelves in Breadth laid upon every Rise whenever there may be Occasion for it, which will save a deal of Trouble in disposing of the Plants.

In the Erection of these *Stoves*, it will be of great Service to join them all together, with only Glass Partitions between them, (as was before observ'd;) and where several of these *Stoves* and *Greenhouses* are requir'd in one Garden, then it will be very proper to have the *Greenhouse* in the Middle, and the *Stoves* at each End, either in the Manner directed in the Plan of the *Greenhouse* exhibited in that Article, or carry'd on in one strait Front: And in the Contrivance of these it may be so order'd, that upon opening an Iron Regulator plac'd at the End of the angular Flue of the *Stove*, and stopping another plac'd at the Entrance of the back Flue, the Smoak may be made to pass thro' the *Greenhouse* in extreme hard Frost, which will be sufficient to prevent its ever freezing in the House: For want of which Contrivance, it is hardly possible to keep out the Frost in very severe *Winters*.

By this Contrivance in the Structure of these Houses, a Person may pass from one to the other of them without going into the open Air; which, besides the Pleasure to the Owner, is also of great Use, because there will

be no Occasion of making a Back-way into each of them, which otherwise must be, because the Front Glasses of the *Stoves* should not be open'd in cold Weather, if it can possibly be avoided on any Account, because the cold Air rushing in, will greatly prejudice the very tender Plants.

But besides the *Stoves* here describ'd, and the *Green-house*, it will be very necessary to have a Glass-Case or two, where-ever there are great Collections of Plants. These may be built exactly in the Manner already describ'd for the *Stoves*, with upright Glasses in Front, and sloping Glasses over the Top of them, which should run within four Feet of the Back of the House. The Height, Depth, and other Dimensions should be conformable to that of the *Stoves*, which will make a Regularity in the Building. These may be plac'd at the End of the Range on each Hand beyond the *Stoves*; and if there be a Flue carry'd along under the Floor of each, which may be open'd in severe Frost, (in the manner already directed for that under the *Greenhouse*) and the Smoak of the adjoining *Stove* made to pass off through these, it will save a great deal of Labour, and prevent the Frost from ever entering the House, be the *Winter* ever so severe: But the upper Glasses of these Houses should have either Shutters to cover them, or else Tarpaulins to let down over them in frosty Weather; and if there is a Contrivance to cover the upright Glasses in Frost, either with Mats, Shutters, or Tarpaulins, it will be of great Use in *Winter*, otherwise the Flue must be open'd when the Frost comes on, which should not be done but upon extraordinary Occasions; because the Design of these Houses is, to keep such Plants as require only to be preserv'd from Frost, and need no additional Warmth, but, at the same time, require more Air than can conveniently be given them in a *Greenhouse*: In one of these Houses may be plac'd all the Sorts of *Ficoides*, *African Sedums*, *Cotyledons*, *Senecio's*, and other Succulent Plants from the Cape of Good Hope. In the other may be plac'd the several Kinds of *Anemonospermus*, *Jacobæa's*, *Doria's*, *Alaternoides's*, and other woody or herbaceous Plants from the same Country, or any other in the same Latitude.

Thus by contriving the *Green-house* in the Middle, and two *Stoves* and a Glass-Case at each End, there will be Conveniency to keep Plants from all the different Parts of the World, which can be no otherwise maintain'd but by placing them in different Degrees of Heat, according to the Places of their native Growth.

STRAMONIUM; Thorn-Apple.

The Characters are;

The Flower consists of one Leaf, shap'd like a Funnel, and cut into several Segments; out of the Flower-cup rises the Pointal, which, when the Flower decays, becomes a roundish Fruit, armed for the most part with sharp Thorns, and divided into four Cells form'd by a Partition, dispos'd in the Figure of a Cross, furnish'd with four

four Placentas or nutritive Membranes, to which several Kidney-shap'd Seeds do adhere.

The Species are ;

1. STRAMONIUM ; *fructu spinoso, rotundo, flore albo simplici*. Tourn. Thorn-Apple, with a round prickly Fruit, and a single white Flower.

2. STRAMONIUM ; *fructu spinoso, oblongo, caule & flore violaceo*. Boerb. Ind. Thorn-Apple, with a longish prickly Fruit, and Violet-colour'd Stalks and Flowers.

3. STRAMONIUM ; *ferox*. Boccon. Thorn-Apple, with very long, sharp Prickles.

4. STRAMONIUM ; *Americanum, minus, Alkekengi folio*. Tourn. Lesser American Thorn-Apple, with a Winter-Cherry Leaf.

5. STRAMONIUM ; *Malabaricum, fructu glabro, flore simplici violaceo*. Tourn. Malabar Thorn-Apple, with a smooth Fruit, and a single Violet-colour'd Flower.

6. STRAMONIUM ; *fructu spinoso rotundo, flore violaceo duplici vel triplici*. Tourn. Thorn-Apple, with a round, prickly Fruit, and Violet-colour'd Flowers, which are two or three times double.

There are some other Species of this Plant which are preserv'd in some curious Botanick Gardens, but as they have little Beauty or Use, so I shall not enumerate them in this Place. The first Sort is used to make a cooling Ointment, which is by many Persons greatly esteem'd. This, tho' not a Native of this Country, yet is now become so common upon Dunghills and other rich Grounds, as not to be easily eradicated. The Seeds falling, do continue all the Winter in the Ground, and in Spring the Plants will come up, and, if suffer'd to stand, will spread over the whole Spot of Ground, and produce such Quantities of Seeds as to leave a Stock to furnish the Ground for some Years.

The second Sort is not as yet quite so common as the former, tho' it is equally as hardy ; and where the Seeds are permitted to fall, the Plants will come up in great Plenty the following Summer. This Sort will grow much larger than the former. I have measured one of these Plants which grew upon a rich Soil upward of six Feet high, and divided into many strong Branches, which spread almost eight Feet Diameter ; so that 'tis unfit to stand in small Pleasure-Gardens, and only to have a Place in some outward Part of a Garden or Yard, because it takes up too much Room.

The third Sort is somewhat like the former in the Appearance of the Plant, but the Fruit is smaller, and beset with very long, fierce Thorns ; for which Variety it is preserv'd in the Gardens of those who are curious in Botany.

This Species is by some suppos'd to be the *Datro* of the Persians, with the Seeds of which they use to intoxicate Persons on whom they have any Designs.

This Sort is not quite so hardy as the two former, so must be sown on a moderate Hot-bed in the Spring ; and when the Plants are come up, they should be transplanted on a new Hot-bed to bring the Plants forward, but you must be careful not to draw them too

much by keeping the Glasses close, which will render them very weak and unfit to stand abroad : Therefore after they have taken Root, they should have Plenty of fresh Air when the Weather is warm, and in May they should be inur'd to the open Air by degrees, into which they may be transplanted in June, observing to raise the Plants with a large Ball of Earth, and plant them in a rich Soil, giving them Water until they have taken Root. In July these Plants will flower, and their Seeds will ripen in August.

The fourth Sort will grow larger than the last mention'd. This is preserv'd more for the sake of its long, tubulous, white Flowers than any other Beauty in the Plant. It is somewhat tender, and should be sowed on a Hot-bed in the Spring, and manag'd as the former, otherwise, if the Season proves cold, the Seeds will not ripen ; tho' I have sometimes had Plants of this kind which came up from Seeds that scatter'd in Autumn, and ripen'd their Seeds very well ; so that I believe, in a few Years, it may be inur'd to this Climate, so as to thrive with little Care.

The fifth and sixth Sorts do produce very beautiful Flowers, which afford an agreeable Scent at some Distance, but if smelt to very close is offensive to the Head. The Flowers of these Kinds are Violet-colour'd on the Outside, but are white on the Inside ; and those of the sixth Sort have two or three Flowers within each other, in the manner of the *Primrose*, which is called *Hose in Hose*. These two Sorts are much more tender than either of the former, and must be sown early in the Spring on a Hot-bed ; and when the Plants are come up, they must be transplanted into a fresh Hot-bed to bring them forward ; and as the Heat of this Bed declines, there should be a fresh one prepar'd, in which should be plung'd Pots fill'd with light, rich Earth, into which the Plants should be plac'd, observing to water and shade them until they have taken Root ; after which they should have Air given to them, in Proportion to the Heat of the Season, and must be often water'd, being very thirsty Plants.

Thus they must be pushed on by Heat, in the manner directed for *Amaranths* ; to which the Reader is desir'd to turn for their farther Culture. In July, if the Season be warm, they may be remov'd into the open Air, placing them in a warm Situation, where they will produce their Flowers plentifully ; and if the Autumn be warm, their Seeds will ripen very well ; but it will be a sure Method to preserve one Plant of each Kind under Glasses, lest those in the open Air should not perfect their Seeds.

STRAWBERRY ; *vide* *Fragaria*.

STRAWBERRY-TREE ; *vide* *Arbutus*.

STYLE : The Style of a Flower is a Body accompanying the Ovary, either arising from the Top of it, or standing as an Axis in the Middle, with Embryons of the Seeds round it.

STYRAX ;

STYRAX ; [takes its Name of *Stiria*, Lat. an *Isicle*, because a resinous Matter issues like Drops out of the Tree. We have many Gums from this Tree : The first is the Red *Styrax* ; or, as it is call'd by some, the *Jews Frankincense*, because they believe it to be that Resin that the *Wise Men* brought and offer'd to our *Saviour*. This Mass is reddish, or yellowish, and is extracted out of the Tree by an Incision. Another Kind is the *Styrax Calamita*, because in old Times it was transported in Pipes of Reeds to preserve its Odour. This *Styrax* is on the Outside of a red Colour, and white within, of a sweet aromack Scent, very grateful. The third is Liquid *Styrax*, which is an oily viscous Substance, of the Consistence of an Ointment, of a greyish Colour, and an aromack Scent ; but this is the Product of a different Tree. Some extract an Oil from the Nuts, that is called *Liquid Styrax*.] The *Storax* Tree.

The Characters are ;

The Flower consists of one Leaf, shap'd like a Funnel, and cut into several Segments ; out of whose Flower-cup rises the Pointal, which is fix'd like a Nail in the fore-part of the Flower ; this afterwards becomes a roundish, fleshy Fruit, including one or two Seeds in hard Shells.

We have but one Species of this Plant, viz.

STYRAX ; *folio Mali Cotonei*. C. B. P. *Storax*-Tree, with a Quince-Tree Leaf.

This Plant grows plentifully in several Parts of *Afia*, from whence it hath been brought into many curious Gardens in *Europe*, though at present it is very rare in *England*.

It may be propagated by sowing the Seeds in Pots fill'd with fresh, light Earth, and plung'd into a moderate Hot-bed : This should be done as soon as possible, when the Seeds are procur'd ; for if they are sown the latter End of *Summer*, and the Pots kept in a moderate Hot-bed of Tanners Bark all the *Winter*, the Plants will come up the succeeding *Spring* ; whereas those sown in the *Spring* do often remain in the Ground a whole Year before the Plants come up.

When the Plants are up, they should be each transplanted into a separate small Pot, fill'd with light, fresh Earth, and plung'd into a very moderate Hot-bed, observing to water and shade them until they have taken Root ; after which they should be inur'd to the open Air by degrees, into which they must be remov'd in *June*, placing them in a warm Situation, in which Place they may remain till the Beginning of *October* ; at which Time they should be remov'd into the Green-house, placing them where they may enjoy the Benefit of fresh Air when the Weather is mild ; for these Plants are tolerably hardy, and do only require to be shelter'd from severe Frost, for in *Italy* they grow extremely well in the open Air, and produce Fruit in great Plenty ; from whence I receiv'd a Parcel of the Seeds : But as the Plants do grow very slowly with us, so it would be a good Way to procure some from *Italy*, which might be brought over in the *Spring*, pack'd up in Cases with Moss, as is practis'd in bringing over *Orange-Trees*,

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Jasmines, &c. and these Plants being well grown before they are brought over, will be more hardy than those rais'd from Seeds here, and will be more likely to produce Fruit.

The Resin of this Tree is brought over for Medicinal Use.

I shall beg Leave to add another Tree in this Place, which altho' very different in its Characters from the foregoing, yet as it hath not been settled to any particular Genus by the *Botanists*, and having long pass'd under the Name of *Storax*, I shall continue it by that Name in this Place, having the Authority of Mr. Ray for so doing.

STYRAX ; *arbor, Virginiana, aceris folio*. Raii Hist. The Virginian *Storax*-Tree, with a Maple Leaf, commonly call'd Liquid-Amber.

This Tree grows very plentifully in *America*, from whence the Seeds have been brought into *England*, where there has been a great Number of Plants rais'd therefrom, which are found to be hardy enough to endure the Cold of our ordinary *Winters* in the open Air : And it is very probable, as the Trees grow larger, and more woody, so they will the better resist the Cold ; but while they are young, the tender Branches are very subject to perish with severe Frost.

This Plant may be propagated by sowing the Seeds in the *Spring* in Pots fill'd with fresh, light Earth, which should be plung'd into a moderate Hot-bed, and duly water'd ; when the Plants are come up, (which sometimes happens in six Weeks after sowing, though often they remain in the Ground until the second Year ; in which Case, the Earth of the Pots should not be disturb'd until you see whether the Plants will come up or not) they should be carefully kept clear from Weeds, and water'd frequently ; and in *June* they should be remov'd into the open Air, placing them in a warm Situation, where they may remain until *October* ; at which Time they should be plac'd in a common Hot-bed Frame, where they will be protected from severe Frost : But the Glasses being kept off in mild Weather, they may enjoy the free Air.

Towards the latter End of *March*, or the Beginning of *April*, these Plants may be taken out of the Pots, and planted into the full Ground : In order to which, a Bed or two of light, fresh Earth should be prepar'd in a warm Situation, into which the Plants may be planted at about a Foot asunder each Way, which will be full Room enough for 'em to grow two Years ; and being plac'd so close, they may be much easier cover'd, if the *Winter* should prove very severe.

When they are planted, the Surface of the Ground must be cover'd with Mulch, to prevent the Wind and Sun from drying the Ground too fast ; and if the Season proves dry, it will be proper to water them now and then until they have taken Root, after which they will require no farther Care but to keep them constantly clear from Weeds until *November* following ; when it will be proper to lay a little fresh Mulch upon the Surface of the Ground to keep out the Frost ; and if the

Winter

Winter should be very severe, the Plants must have a little *Peas-Haulm*, or some Mats thrown over them to protect them from the Frost.

In these Beds the Plants may remain two Years; after which they should be remov'd in the *Spring* to the Places where they are to remain, or else into a Nursery, where they must be planted at a greater Distance, so as to have Room to grow two or three Years longer. These Trees will grow very vigorously after they have stood two or three Years; so that when their Roots have acquired Strength, they will make great Progress in their Growth: With us they will grow to be upward of twenty Feet high, so should be plac'd amongst Trees of the same Growth, and in a warm Situation.

The Leaves of this Tree do sweat out a liquid Resin in hot Weather, which when rubbed between the Fingers, emits a fragrant Scent; but I have not seen any Flowers produc'd in *England* as yet.

SUBER; The Cork-Tree.

The Characters are;

It is in all respects like the Ilex, excepting the Bark of the Tree, which in this is thick, spongy, and soft.

The Species are;

1. **SUBER**; *latifolium, perpetuo virens.*
C. B. P. The Broad-leav'd ever-green Cork-Tree.

2. **SORBUS**; *angustifolium, non serratum.*
C. B. P. The narrow-leav'd Cork-Tree, with smooth Edges.

There are several other Species of this Tree mention'd in some of the *Italian Catalogues* of Plants; but the two Sorts here mention'd are all I have observ'd in the *English Gardens*.

These Trees may be propagated by sowing their Acorns in the *Spring*, in the manner directed for the *Ilex*, to which these exactly agree in Culture; therefore, to avoid Repetition, the Reader is desir'd to turn to that Article for farther Instruction.

SUBTERRANEAN, is that which is under or within the Surface, Bowels or Caverns of the Earth, or the hollow Places of the Earth that are under Ground.

SUCCORY; *vide Cichorium.*

SUCCULENT PLANTS, are such whose Leaves are thick, and abound with Juice.

SULPHUREOUS, is full of Brimstone.

SUMACH; *vide Rhus.*

SUMMITS, or *Apices* are those Bodies which contain the prolific Powder, analogous to the Male Sperm in Animals: These generally hang upon the *Stamina* or Threads, which surround the *Ovary* in Flowers.

SUN, has usually been reckon'd among the Number of Planets, but he ought rather to be numbred among the fix'd Stars.

According to the *Copernican Hypothesis*, which is now generally receiv'd, and which has even Demonstration on its Side, the *Sun* is the Center of the planetary and cometary System; round which all the Planets and Comets, and our Earth, among the rest, revolve in different Periods, according to their different Distances from the *Sun*.

But the *Sun*, tho' thus eas'd of that prodigious Motion, whereby the Antients imagin'd him to revolve daily round our Earth; yet is he not a perfectly quiescent Body.

From the *Phænomena* of his *Maculae* or Spots, it evidently appears, that he has a Rotation round his Axis, like that of the Earth, whereby the natural Day is measur'd, only slower.

Some of these Spots have made their first Appearance near the Edge or Margin of the *Sun*, and have been seen some time after on the opposite Edge; whence, after a Stay of about fourteen Days, they have re-appear'd in their first Place, and taken the same Course over again, finishing their intire Circuit in twenty-seven Days time; which is hence deduc'd to be the Period of the *Sun's* Rotation round his Axis.

This Motion of the Spots is from *East* to *West*; whence it is concluded, that of the *Sun*, to which the other is owing, is from *East* to *West*.

Dr. Hook thinks it reasonable to conclude, That the Superficies of the *Sun* is cover'd with Air, or Atmosphere, or some other fluid Body; and that this Atmosphere, tho' possibly eighty times thicker than that about our Earth, yet in Comparison of the vast Diameter of the *Sun's* Body, becomes wholly invisible to us, though assisted by the best Telescopes.

He supposes it also to look as bright as the Body of the *Sun* itself, and that it is really the Shell of this Atmosphere, and not the very Body of the *Sun* that shines: And from hence he says, That all the *Phænomena* of the *Maculae* and *Faculae* of the *Sun* will be solv'd, and that they are only Clouds or Smoaks in this Atmosphere.

He concludes, That the *Sun* itself within this Atmosphere is a solid and opacous Body, from these Reasons:

1. The Constancy of its Rotation.
2. The Fixedness of its Axis.
3. The Power of its Gravitation or Attraction towards its Center.

He concludes, That these prove its Solidity and Opacity from the disappearing of the solar Spots in the Limb, and their not returning backwards, as they would seem to do if the Body were transparent as the Atmosphere is, or the Flame of a Candle, or the Radiation or hazy Light about the *Nucleus* of a Comet, through which, as well as through its Beard, the small fix'd Stars may be seen.

He thinks the superficial Parts of the *Sun* to consist of Bodies, similar to our Nitre and Sulphur; and that these are set on Fire, and consequently, that the Physical Cause of its

Light is the actual Burning or Fire of its superficial Parts.

Nor can there be any Objection of Moment brought against this Hypothesis, from the Danger of the *Sun's* Fire being burnt quite out in so many thousand Years as it hath been in Being; for (says he) supposing it to have grown some Minutes less, since it began to give Light, none can contradict it by any Observations we have upon Record.

For supposing we had Astronomical Observations of 4000 Years standing, as we have none above 2000 of that kind; and allowing that the *Sun's* Diameter had then been observ'd to be as many Minutes as it is now; yet it could not thence be concluded, that the *Sun* did not lose a Mile in Diameter every Year, and consequently be now 4000 Miles less in Diameter than it then was.

For since his Diameter is near 87 times greater than that of the Earth, which latter he supposes 8000 Miles, then the *Sun's* must be 696000 Miles. Now 4000 is but 174th Part of the Diameter, and consequently would have diminish'd it but $\frac{1}{4}$ of a Minute, which is a much less Quantity than the Antients pretended to observe to.

But supposing they could have observ'd even to Seconds, yet that could not have contradicted it, because it is possible the *Sun* may have approached as much nearer us as that Diminution amounts to, and for which, he saith, he could shew a Reason.

Sir Isaac Newton also in his *Opticks*, gives good Reason to suppose the *Sun* and fix'd Stars to be great Earths, vehemently hot; whose Heat is conserv'd by the Greatness of their Bodies; and the mutual Action and Reaction between them and the Light which they emit, and whose Parts are kept from fuming away, not only by their Fixity, but also by the vast Weight and Density of the Atmospheres incumbent on them, and every way strongly compressing them, and condensing the Vapours and Exhalations which arise from them.

The Light seems to be emitted from the *Sun* and fix'd Stars (which probably are *Suns* to other Systems) much after the manner as Iron, when heated to such a Degree, as to be just going into Fusion by the vibrating Motion of its Parts, emits with Force and Violence copious Streams of liquid Fire all around: Great Bodies must preserve their Heat longest, and that, perhaps, in the Proportion of their Diameters.

Sir Isaac Newton hath made it probable, that the great Comet in the Year 1680, in its *Perihelion*, went so near the *Sun*, as that it acquired a Heat, which would not intirely go off in 50,000 Years: Whence we may guess, that if the *Sun* and fix'd Stars be only Collections of dense and solid Matter, like the Planets, but heated to a very intense Degree, they may be many Millions of Years without losing any considerable Part of their Heat.

According to *Cassini*, the *Sun's* Distance from the Earth is 172,800,000 *English* Miles.

As for the annual Motion of the *Sun* round the Earth; it is easily shewn by Astronomers, that the annual Motion of the Earth will occasion such an Appearance. A Spectator in the *Sun* would see the Earth move from West to East, for the same Reason that we see the *Sun* move from East to West; and all the *Phænomena* resulting from this annual Motion, in which soever of the Bodies it be, will appear the same from either.

As to the Nature, Properties and Figure of the *Sun*, &c.

1. As the solar Spots are found sometimes to stay three Days longer behind the *Sun* than they spend in passing over the Hemisphere visible to us; we easily deduce, that they don't adhere to the Surface of the *Sun*, but are at some Distance therefrom.

2. As the Spots frequently rise, and vanish, even in the Midst of the *Sun's* Disk, and undergo several Changes, both with regard to Bulk, Figure, and Density, it follows, that they frequently rise, *de novo*, about the *Sun*, and are again dissipated.

3. Hence it should follow, that they are form'd out of the Exhalations of the *Sun*, and are no other than solar Clouds.

4. Since then Exhalations proceeding from the *Sun*, rise above him, and stop at a certain Altitude; it is evident, there is some Fluid encompassing the *Sun*, to urge the Exhalations to rise; and this Fluid must be denser at Bottom, and rarer at Top, like our Atmosphere.

5. Since the Spots frequently dissolve and disappear in the Middle of the *Sun's* Disk; the Matter of the Spots, that is, the Solar Exhalations, fall back again to the *Sun*: Whence it follows, that there must arise various Alterations in the *Sun's* Atmosphere, and the *Sun* himself.

6. Since the Revolution of the Spots round the *Sun* is found very regular, and likewise very near the *Sun*; it follows, that they do not revolve round the *Sun*, but that the *Sun*, together with his Atmosphere, wherein the *Maculae* are, move round their common Axis, in an Interval of about twenty-seven Days; and hence it is, that the Spots near the Limb, being view'd obliquely, appear narrow and long.

7. Since the *Sun* in every Situation appears like a circular Disk, its Figure, as to Sense, must be spherical, though it is really spheroidal.

8. That the Substance of the *Sun* is Fire, is thus prov'd: The *Sun* shines, and his Rays collected by concave Mirrors or convex Lens's, burn, consume, and melt the most solid Bodies, or else convert them into Ashes or Glafs.

Wherefore, as the solar Rays are diminish'd by their Divergency in a Duplicate Ratio of the Distances reciprocally taken, 'tis evident their Force and Effect is the same when collected by a burning Lens or Mirrour, as if we were at such Distance from the *Sun* where they were equally dense. The *Sun's* Rays

Rays therefore, in the Neighbourhood of the *Sun*, produce the same Effects as might be expected from the most vehement Fire ; consequently the *Sun* is of a fiery Substance.

Hence it follows, that its Surface is every where fluid ; that being the Condition of Flame.

Indeed it is not absolutely determined, whether the whole Body of the *Sun* be fluid, as some think, or solid, as others ; but as there are no other Marks, whereby to distinguish Fire from other Bodies, but Light, Heat, a Power of Burning, Consuming, Melting, Calcining, and Vitrifying, we don't see what should hinder, but that the *Sun* may be a Globe of Fire like ours, invested with Flame.

9. Since the *Maculae* are form'd out of the Solar Exhalations, it appears, that the *Sun* is not pure Fire ; but that there are heterogeneous Particles mixed along with it.

As for the Distance of the *Sun*, Astronomers are not agreed ; the Reason is, that the Determination thereof depends on that of the Parallax, and the Parallax of the *Sun* not being to be found without a long and operose Calculation.

Some make the mean Distance of the *Sun* from the Earth, 7490 Diameters of the Earth, others 10000, others 12000.

The learned *Herman Boerhaave*, treating concerning Fire, says we have two vulgarly reputed Sources or Funds of it, *viz.* in the *Sun*, and the Centre of the Earth.

For the first we have the concurrent Opinions of the Philosophers of all Ages, except one, who held the *Sun* to be cold.

As to the Central Fire, though our Observations do not go so far, yet this is manifest, that there is an ample Proportion of Fire under-ground ; and even that Fire appears much more abundant there than on the Surface ; so that at least a subterraneous Fire must be granted.

Thus they who dig Mines, Wells, &c. constantly observe, that while they are yet but little below the Surface, they find it a little cool ; as they proceed lower it grows much colder, as being then beyond the Reach of the *Sun's* Heat, inasmuch that Water will freeze almost instantaneously ; and hence the Use of Ice-houses, &c. But a little lower, about forty or fifty Feet, it begins to grow a little warmer, so that no Ice can bear it ; and then the deeper they go, still the greater Heat, 'till at length it endangers the Stoppage of Respiration, and puts out their Candles.

Morinus, a French Author, who had the Curiosity to descend himself into the Mines of Hungary, some of which are three or four hundred Fathoms deep, relates, That after he had descended about an hundred Fathoms, he came into a very warm Region of the Earth, which lasted to the Bottom of the Mine ; being so hot both in Winter and Summer, that the Labourers usually work without their Cloaths : He adds, That he himself was scarce able to bear the Heat. He was further told by the Overseers, that it was universal ; the lower

they descend beyond an hundred Fathoms, the hotter it still growing.

Dr. *Boerhaave* adds, That if they venture farther with a lighted Candle, than the Place where it puts their Candles out, the Place shall be found immediately full of Flame ; as once happened in the Coal-Pits in Scotland, where a hardy Digger, descending to an unusual Depth, with a Light in his Hand ; the Fumes, which are there found very copious, caught Fire thereby (they being no other than Oil or Sulphur greatly rarefied and volatiliz'd by Heat) and burnt the whole Mountain down.

It seems as if Nature had lodg'd another *Sun* in the Center, to contribute on its Part to the giving of Motion to Bodies, and to the promoting of Generation, Nutrition, Vegetation, Germination, &c. of Animals, Vegetables, and Fossils ; and that all Productions, under-ground in particular, as of Metals, Salts, &c. are wholly owing thereto.

How this subterraneous *Sun* arose may admit of some Doubt ; whether it were form'd there from the Beginning, like the *Sun* in the Firmament, or gradually produc'd by a secondary Collection of vague Fire into this Place.

What pleads in Favour of the former Opinion, are Volcanoes, or burning Mountains, which appear to have existed from the first Ages : For *Aetna's* Flames are spoke of among the ancient Poets, as even then of great Antiquity ; and such Mountains are found in the coldest Regions, *viz.* *Nova Zembla* and *Iceland* ; as well as the hottest, as *Borneo*, &c.

As to this, Mr. *Boyle* observes, that it cannot be reasonably pretended, that the subterranean Heat proceeds from the Rays of the *Sun*, since they heat not the Earth above six or seven Feet deep, even in the Southern Countries. And if the lower Part of the Earth were of its own Nature cold, and receiv'd the Heat it affords only from the *Sun*, the deeper Men descend therein, the less Degree of Heat and Steams they would meet with.

Dr. *Boerhaave* adds, that as to the other Opinion, it is urg'd, that such Source of Fire might have arose there in Time, on the Principle of Gravity.

For though Fire be by Nature equally diffused every where, yet as we shew it to be a Body, and invested with the other Properties of Body, it must have Weight, and in consequence thereof must have a Tendency towards the Center.

Hence it must be accumulated deep under Ground ; and the more so, the nearer the Center, which may be esteem'd the common Seat or Receptacle it all tends to.

This may receive some Confirmation from hence, That the central Space is allow'd to be possessed by the heaviest and most solid Bodies ; but we know of nothing to enter the Pores of these Bodies, and make them more solid than others, except Fire.

Upon the whole in the first View, there should be two great Fires, an upper or *solar*, and

and a lower or *central* one, in all respects alike, and the same with each other, according to the *Dogma of Trismegistus*.

On the second View, the central and subterraneous Fire is not original and elementary, but determined and collected Fire; such as we have it on various Occasions about the Surface.

It may be added, that the denying Vent or Passage to this subterraneous Fire, appears to be the Cause of Earthquakes; those usually arising upon a Vulcano's appearing to be stopp'd up, or ceasing its Eruptions, and going off again upon its opening, or burning afresh.

Fire may be collected in two manners: First, by a Luminary determining its Rays into a Parallelism; secondly, by Attrition.

First, Fire is collected when by any Means a Quantity thereof is driven into a lesser Compass; it being Part of the Character of Fire, that it spreads itself equally; so that if left to itself, it would be found no more here than there, and consequently would be insensible every where; but if by any Cause it be directed toward any certain Part, then it discovers itself: And such a Cause is the *Sun*, which revolving with prodigious Velocity around his Axis, directs the impervious Corpuscles of Fire, every Way in parallel Right Lines, and determines them toward certain Places.

The *Sun* therefore does not produce or emit Fire, but only puts it in Motion in Right Lines, and thus collects it. And hence it is that we perceive Fire so long as the *Sun* is above the Horizon; and upon his setting, lose it again; by reason, as his Action ceases, the Fire again spreads itself all around.

The *Sun*, according to that excellent Chymist, the young *Lemery*, seems to be no other than a huge Mass, or Collection of the Matter of Fire or Light, though placed at such a Distance as to disable it to act on Bodies here on Earth, otherwise than by one of these two Ways: First, by Emanations or Emissions of his own Substance transmitted hither; but this Hypothesis being subject to great Difficulties, and not sufficiently answering to certain *Phænomena*, Recourse is had to another, which supposes Trains of Fire or Light, dispos'd in all the Interstices of the grand Expanse of Air and Æther between the *Sun* and us, and that these Trains are made to act on terrestrial Bodies, by their being vigorously driven or impell'd toward such Bodies, by the immediate Action of the *Sun* thereon.

These Trains, in effect, may be esteem'd as a Sort of little *Suns* prolonged, but always depending on the great *Sun*, as the Source of their Motion and Action on Bodies; 'tis those that form the Rays of Light; they do not, in point of Matter, differ from the Substance of the *Sun* himself; but only in this, that the same thing is more copious in one Case than the other.

In the *Sun* we may suppose the Matter of Light more abundant than in the Focus of our largest Burning-glasses. Thus from the

vehement Action of the Rays of the *Sun*, collected in such Glass, we learn what Use the Air interposed between the Rays of Light is of, in tempering their Action, and rendering it more supportable; since without such Medium, instead of warming and illuminating, it would blind and burn us.

So that the Air may be consider'd as having somewhat of the same Effect, with respect to the Rays of Light falling upon us, that the Water in a *Balneum Mariæ* has. *Mém. de l'Acad. Ann. 1713.*

Omitting to enter into a particular Discussion about the Matter of the *Sun*, and whether it be Fire, to us it appears very extraordinary, that the *Sun*, after a continual Emission of the Corpuscles of Fire upwards of 5000 Years, yet should not be yet exhausted.

The *Sun* and Stars, according to Sir *Isaac Newton's* Conjecture, are no other than great Earths vehemently heated: For large Bodies, he observes, preserve their Heat the longest, their Parts heating one another; and why may not great, dense, and fixed Bodies, when heated beyond a certain Degree, emit Light so copiously, as by the Emission and Re-action thereof, and the Reflection and Refraction of the Rays within the Pores, to grow still hotter, 'till they arrive at such a Period of Heat as is that of the *Sun*?

Their Parts may be further preserved from fuming away, not only by their Fixity, but by the vast Weight and Density of their Atmospheres incumbent on them, and strongly compressing them, and condensing the Vapours and Exhalations arising from them.

Thus we see, that warm Water in an exhausted Receiver, shall boil as vehemently as the hottest Water, open to the Air; the Weight of the incumbent Atmosphere, in this latter Case, keeping down the Vapours, and hindering the Ebullition, 'till it has conceiv'd its utmost Degree of Heat.

So also, a Mixture of Tin and Lead, put on a red-hot Iron, *in vacuo*, emits a Fume and Flame; but the same Mixture in the open Air, by reason of the incumbent Atmosphere, does not emit the least sensible Flame. *Ibid. Optic.*

But to return to Dr. *Boerhaave*. It is, says he, much safer to say, that the *Sun* has the Power of determining Fire, than that it furnishes it. The Case may be the same, as in *M. Villette's Mirror*, which, when expos'd to the naked *Sun*, produces such amazing Effects, and yet has no Effect at all, if the *Sun* be covered from it, by the Interposition of a Cloud, or the like: The Mirror may appear the Cause of Burning, but it is only an Instrument necessary thereto; and the *Sun* may be no more.

If now the *Sun* impel the Matter of the Fire in Right Lines, we call it Light, which Light is not any fiery Corpuscles in the *Sun* itself, but the vague Fire above-mentioned, put in a new Determination by the *Sun*, and collected into some one Place.

Hence

Hence arises Heat. For all Heat depends on Fire; nor is it felt, unless increased in proportion to our Senses, *i. e.* so as to be capable of affecting our Organs.

While the *Sun* is above the Horizon he impells all the Rays, before vague and fluctuating toward a Focus; and such Impulsion or Determination is always in Right Lines; so that all our Light, Heat, and Colour is the Effect of a rectilinear Motion.

Suppose, for Instance, a Fire in a dark Place, and a Thermometer placed at a certain Distance therefrom, with an Iron Plate between them; in this Case the Thermometer will not be affected by the Fire, by reason that the rectilinear Passage of the Heat is stopped. Nor need it be added, that under the like Circumstances, no Light, Colour, &c. is perceivable; so that none of these act but in Right Lines.

If there were no *Sun*, nor any Body to supply its Place, there would be no Heat, *i. e.* the Fire would not be determined in Right Lines: So that the *Sun* is the Father of all Heat; or some other Body that acts in the same Manner as the *Sun*: For the *Sun* does not make Heat, but only the Difference between the Heat of the Day and the Night.

The Excess of Heat which we feel by Day, is not owing to the Matter of the Fire, but to the *Sun*. For as to the Quantity of Fire, it has been observ'd, 'tis the same by Night as by Day, and that is the Determination in parallel Lines, that makes the Difference in point of Heat.

Thus no body would imagine, in stretching forth his Hand, that it should be press'd, as with a huge Weight, both upward and downward, as if pinch'd in a Press, and yet there is no Dispute as to the Fact; and the only Reason why he is not sensible of it, is, that the Pressure is equal every Way.

So it is with Fire, which, when equally moved every Way, does not give any sensible Heat; but when the *Sun* shines, he moves or directs it in Right Lines, and thus renders its Heat perceivable.

As to this, another Author adds; 'Tis not very difficult to conceive how Fire should become sensible, either to the Feeling or the Sight, by being thus determined in Right Lines.

By such Determination the vague, fluctuating Corpuscles are form'd into Rays, and a Train of them driven upon the Organ in a constant Succession.

Hence each subsequent one seconding the Effort of the preceding one, the Impression by such a Series of Augmentations at length is felt. Thus the Air, with which we are every Way surrounded, if left at Liberty is not perceived; but if its Particles be driven or directed in a Stream, whether by a Pair of Bellows, or any other Cause that excites a Wind, the Impression it makes will be sensible.

Dr. Boerhaave adds; It may be doubted therefore, whether the *Sun*, for all his Spots, be a hot Body; since, if he were really so,

he must transmit us more Fire in *Winter* than in *Summer*.

As to this, Bacon *de forma calida* says, It has often been wondred at, why in *Nova Zembla* the *Sun* should never have Power to melt Ice; notwithstanding that, for the Space of some Weeks, his Brightness is not less conspicuous than with us.

So the *Dutch*, who wintered in that unhappy Region, expected no less, and that in the Month of *July* the Sea should be thaw'd, and they left at Liberty to pursue their Voyage; but were mistaken. This gave my Lord Bacon Occasion to observe, that the *Sun's* direct Rays have no sensible Effect, not even on a level Country; nor yet the reflected Rays, unless the Line of Reflection be near that of Incidence, *i. e.* unless the Angle intercepted between them be very small; so that they may, as it were, strengthen and increase the Effect of each other. Now, the more perpendicularly the Rays fall, the smaller is the Angle: Hence, in *Nova Zembla*, where they fall extremely obliquely, the Rays by Reflection are sever'd, and that Effect thus render'd insensible.

Dr. Boerhaave also adds: After the same Manner arise Colours, which are nothing else but the Matter of Fire drawn in parallel Lines, without which Motion there would no such thing ever be seen.

If now the Particles of Fire, before moving in a parallel Direction, become determin'd anew in Lines that converge, the Effect of the Fire must of Necessity be heightened, by reason a larger Quantity of Fire is, by such Means, collected into one Place.

And were it not that by such Increase of Quantity its Particles have a greater Attrition, the Forces of Fire would be proportionable to the Spaces it possess'd.

But in bringing the Particles so near, 'tis impossible but they must strike on each other; and hence, the nearer they approach, the greater and quicker the Attrition; and a brisk Attrition does collect Fire of itself.

If then the Quantity of Fire in any Place be increased, *e. g.* six-fold, the Attrition will of consequence be augmented proportionably thereunto.

Some maintain, that Fire acts with more Force as the Resistance of the *Medium* is less; but the contrary is true; for Fire would be incapable of warming, unless either reflected or collected.

The Heat would be never the greater for the *Sun's* acting on the Fire, unless in its Progress it were either refracted or reflected, and by that Means determined to one Place more than to another.

And hence it is, that the Cold, *ceteris paribus*, is always greatest in still Weather; and that in the Severity of *Winter*, and particularly frosty Weather, the Heavens are clear.

Thus also the Tops of the tallest Mountains, where the Reflection and Refraction are less considerable, by reason of the want of Clouds, are eternally cover'd with Snow;

as in *Peru*, *Mexico*, the *Alps*, &c. And to the same Cause it is owing, that the Nights in *Armenia* are shivering cold.

In the mountainous Places in these Countries, we are told, there is no such thing as pure Water, but all Ice.

Plants make a Shift to grow about the Feet of the Mountains, but higher up no Vegetable can live; not for want of Food, but through the Intensity of the Cold; Men staying there but a little Time catch violent Agues, which with a longer Stay grow incurable.

Heat then depends not upon the Fire's being sent or determined toward us, but only by its being reflected, either by Mountains or Clouds.

If Fire be propagated through an uniform Medium, it will never produce any considerable Heats.

And hence it is that the Degree of Heat is not so very intense in the Torrid Zone, as one would otherwise expect; but that in the Island of *Ormus* 'tis perfectly scorching, and not endurable by any Mortal, unless they were to screen themselves under Water.

The Heat here is said to be so vehement, that People, like Fishes, are forced to sleep in Cisterns of Water, with only the Head out, which is kept suspended by a Contrivance for that Purpose: The Cause is, that the said Island is full of Salt Rocks, which act like so many *Spicula*, and reflect the Light in great abundance; so that the Island at a Distance appears like one continued Fire.

Another Cause which some alledge for this excessive Heat, is, that the Island was anciently full of white Mountains, which having in Time been all laid level, the whole Surface of the Island is white, and thus dispos'd to reflect abundance of Light.

Heat therefore does not immediately depend on the *Sun*, but on Bodies that reflect. Hence, in high Places, and where the Atmosphere is very rare, the Heat is extremely feeble, and *vice versa*.

But it remains here to be observed, that according as the Direction of the *Sun's* Rays is greater or less, greater or less Heat is produced. For,

1. A Body striking perpendicularly on another, acts on it with all its Force.
2. A Body striking obliquely against another, acts with the less Force, the more it deviates from the Perpendicular.

Now Fire directed by the *Sun* into Right Lines, must observe the same mechanical Law as other Bodies, and consequently its Action must be measured by the Sine of the Angle of Incidence.

And hence Fire striking on any Obstacle in a Direction parallel thereto has no sensible Effect, by reason the Proportion is almost infinite, *i. e.* nothing.

Accordingly Dr. *Halley* observes, that the *Sun* radiating on the Earth in the Morning has but little Effect, but that when rais'd to the Meridian he acts with all his Force.

Now this is owing to the Atmosphere, which being replete with an infinite Number of Corpuscles, reflects more of the *Sun's* Rays to the Earth, when they fall perpendicularly, than would otherwise arrive there. For whereas falling obliquely, they would be reflected, and thus be thrown off, and dispers'd into other Parts; now that their Incidence is perpendicular they they will pass directly through.

And hence arises what is frequently observ'd by Sailors, *viz.* That when the *Sun* radiates obliquely upon the Sea, as in the Evening, there is no enduring his Rays; by reason they are all reflected from the Water, and scarce any lost therein: So that the Rectitude or Obliquity of the Rays contribute very considerably to the Collecting of Fire.

And this Obliquity, &c. is to be consider'd in a two-fold respect, both with respect to the Matters in the Atmosphere, and to the Surface of the Earth.

Now Heat may be varied two Ways.

1. By Means of the Atmosphere; for this does not always remain the same. Thus, *e. g.* Water is naturally transparent, and if you warm it, it still retains its Transparency; but if you make it boil, the Vapour issuing from it, though perhaps a Million of Times rarer than the primitive Water, will not be transparent, but opaque, by reason its Parts now are in a different Arrangement.

And hence those Legions of Corpuscles every where floating in the vast Receptacle of the Atmosphere, whenever they acquire a different Disposition, which they frequently do, alter the Collection of the Rays on the Earth. Add, that those white Clouds which appear in Summer-time, are, as it were, so many Mirrors, and occasion excessive Heat.

These cloudy Mirrors are sometimes round, sometimes concave, polygonous, &c. When the Face of Heaven is covered with such white Clouds, the *Sun* shining among them must of Necessity create a vehement Heat, since many of his Rays, which would otherwise perhaps never touch our Earth, are hereby reflected to us; thus if the *Sun* be on one Side, and the Clouds on the opposite one, they will be perfect Burning-glasses. And hence the Phenomena of Thunder, &c.

I have, says Dr. *Boerhaave*, observ'd a kind of hollow Clouds full of Hail and Snow; during the Continuance of which the Heat was extreme; since by such Condensation they were enabled to reflect much more strongly: After this came a sharp Cold, and then the Clouds discharged their Hail in great Quantity; to which succeeded a moderate Warmth. Frozen, concave Clouds therefore, by their great Reflections, produce a vigorous Heat; and the same when resolv'd, excessive Cold.

Hence it is probable, that Thunder is only produc'd when such concave Clouds, before convolved into spherical Figures, are driven with opposite Motions against each other; and the Rays transmitted through those Spheres from burning Foci.

All

All Clouds, 'tis probable, contain Snow and Ice, but these in their Fall through the warmer Regions of the Atmosphere nearer the Earth, liquify and distil in Drops.

The Meteors in the Atmosphere have likewise their Share in reflecting of Fire. These, in effect, are a sort of wandering Fire, visible by Night, and which determine the Fire over and upon the Earth.

2. It is varied by means of the Earth: For as the Surface of the Earth varies, so must the Heat. Thus sandy Places reflecting more Rays than others, must excite a greater Degree of Heat.

On the highest Mountains we always find the most Cold, Snow, and Hail.

In the sultry Region of *Peru*, the Mountains are all *Summer* long cover'd with Snow, by reason they only receive direct, and but little refracted Fire; and the Effect of Fire arising merely from being determin'd by the *Sun* into a Parallelism, is found, by Computation to be very inconsiderable. For this Effect, as already observ'd, is greater in *Winter* than in *Summer*.

Though the *Sun* be in his Apogee in the *Summer*, and in his Perigee in *Winter*, yet will a Night's Ice bear its shining upon it five or six Hours ere it be thaw'd.

And if as the *Sun* rises nearear toward the Zenith, the Ice and Snow at length begin to run, this is not owing to the greater Force of the *Sun*, but to the greater Reflection and Collection of his Rays from the Circumstances and Position of the Atmosphere and Earth.

But the highest Tops of Hills are always free from Snow; the Reason whereof is, that Water, *i. e.* the Vapours and Exhalations emitted therefrom, never rise by the *Sun's* Action above a Mile high. But there are Mountains a Mile and a half high; to the Tops of these therefore, Vapour, and consequently Clouds, can never mount.

And hence it is, that in very high Mountains, as the *Pico de Theide* in *Bohemia*, tho' the middle Part be eternally invested with Ice and Snow, and the Bottom scorch'd with intolerable Heat, yet on the Top you find yourself in a pure, thin, serene Air, and view the Clouds hovering at a considerable Distance below you. Hence also it is, that all Thunder is confined within less than a Mile's Height.

Add, that in Caverns, and the hollow Parts under-ground, the Heat is found very great; so that the Air is coldest in the highest Places, and hottest in the lowest; but in the intermediate Atmosphere very unequal.

Heat therefore depends on Clouds, Mountains, &c. which reflect the Light variously, and on the Direction of the *Sun's* Rays, or the Position of his Body with respect to us.

Hence again we gather, that Fire is the universal Cause of all the Motions about our Earth; for all Fluidity depends on Fire; and accordingly in the large Burning-glasses the firmest Bodies become fluid, and evaporate in Fume: And the more fluid any Body is, the

more Fire it contains; whence it is, that Water depriv'd of all its Fire, fixes into Ice, and when expos'd afresh to the Fire, resolves into Water; and all Fluids whatever, if destitute of Fire, would do the same.

Thus far the Learned *Boerhaave*.

The *Sun* (says a certain Author) may be accounted the *Parens Naturæ*, or the *Primum Mobile* of all vegetative Motion.

The *Sun's* attractive Virtue is very conspicuous, in the Exhalation of those crude and unwholesome Vapours, with which the Earth is often infested; which, if they were suffer'd to continue long upon the Face of the Earth, would render it a miserable Desert.

The *Sun*, by subliming those crude and hurtful Vapours, and their being rarefied before their Descension and Distribution, forms them into Rain, which is of great Consequence in Vegetation.

To this he adds, the Attraction of Plants themselves, which creates a kind of Emulation in them, which shall grow the tallest.

But that which the Antients did use to attribute to Attraction, may now be very well solved by Pulsion. To apply which to the Matter in Hand: When the Surface of the Sea, &c. is divided by the Heat of the *Sun*, and the Power of the Air, their Ascension through the Atmosphere, either by the Rarefaction of the Air by the *Sun*, or otherwise by the Respiration of the Terraqueous Globe, which in this Case may be suppos'd to act like the Body Natural; or else that the Air being rarefied by the *Sun's* Beams, does, by the Gravitation of his own Body in general, force those humid Vapours by Pulsion upwards, through those Beams or Rays of Light, which are, as it were, so many Pipes or Tubes for their ready Passage, Ascension, and Conveyance.

Or if those Vapours are convey'd by the Undulation of the Air in a perpendicular Manner, rather than a radiant one, through the Rays and Beams of Light, which soever of these Ways it is, the *Sun* is the principal Agent in this Business; and the whole Process is either Attraction, Pulsion, or Respiration, forwarded by the virtual Power of it.

That the Rarefaction of the Air by Heat is a great Help to Attraction or Pulsion, may be discovered by the Fire Engine made by Mr. *Savory*; we cannot say that the Water is either forced or attracted by the Heat, but that the Air that is in the Pipe is lighten'd by its rarefying Quality to such a Degree, that the *Equilibrium* is lost, and the Impulse and Pressure of the Air, which is without, forces the Water to that great Height that is seen in the Operation.

And so, if a little Scrip of Paper burning and fuming be put into a common Drinking-glass, and it be turn'd up immediately, and put upon a Plate of Water, it seems as tho' it would suck it up into the Glass; when indeed, the Truth of the Experiment is, that it is only the outward Pressure and the inward Weakness of the Air to resist, being purified by Heat: For if the same Glass should be plung'd into a Basin

of

of Water up to the Foot of it, yet the Water that is in the Bason would not enter into the Glafs till the Air, either having lost its own Strength, or rather insinuated or incorporated itself in the Water, loses its own Strength; such is the Force of Air.

But this may suffice concerning what the Ancients call *Attraction*, which in many Cases is solv'd by *Pulsion*, or the Pressure and clastick Power of the *Air*, rather than by the attractive Power of the *Sun*.

It is sufficiently prov'd by ocular Demonstration, that the Vapours of the Sea, Rivers, Lakes, and all the Humidities of the Ground, are drawn up after this manner.

And that Heat is an Agent in this Operation, has been clearly prov'd by the Experiments of that learn'd Naturalist Dr. *Halley*; by taking a Vessel of Water four Inches deep, and seven, and nine Tenths in Diameter; which being warm'd to such a Degree, as it might be suppos'd the Air may do it, in some of the hottest Months; and letting it stand about two Hours time, and weighing it, found it had evaporated near half an Ounce; altho' there did not appear any Reek or Smoak, nor did the Water seem warm, by putting his Finger into it; from which it may be concluded, that out of that small Superficies of the Water, six Ounces would be evaporated in the Space of twenty-four Hours.

Upon this Supposition, every ten square Inches of the Surface of Water, yields in Vapour *per Day* a Cube Inch of Water; and each square Foot half a Wine Pint; and every Space of four Feet square, a Gallon; a Mile square 6914 Tun; a square Degree suppose of 69 *English* Miles will evaporate 33 Millions of Tuns.

This will account for the *Caspian* Sea being always at a Stand, and neither wasting nor overflowing; and also for the Current said to set always in at the *Streights* of *Gibraltar*, notwithstanding that those *Mediterranean* Seas receive so many, and so considerable Rivers.

This Experiment has been carry'd yet farther by the *Oxford* Society; who, supposing a cubical Foot of Water to weigh 76 Pounds, and this Foot containing 1728 cubick Inches, and divided in the 76 Pounds, gives half an Ounce and $13\frac{1}{2}$ Grains, which is the Weight of a cubical Inch of Water; therefore the Weight of the 233 Grains is $\frac{233}{13\frac{1}{2}}$, or 35 Parts of a cubick Inch divided by 38.

Then the Area of a Circle, the Diameter of which is 7 Inches and upwards, is more than 49 square Inches; which if it be divided by $\frac{35}{38}$ Parts of an Inch, the Quantity of Water carry'd off in Vapours, the Product will be $\frac{35}{38}$ or $\frac{35}{38}$ Parts of an Inch wasted in that Experiment. This is a plain Proof of what a great Quantity of Water may be thus carry'd off, in great Dimensions of Water, even enough to supply all Rains, Dews, &c.

But the *Sun* besides this has a diffusive Power, (not to dwell on the Light it conveys to these sublunary Regions) without which the whole Race of Mankind must wander

and grovel in the Dark; for by its genial and chearful Rays, it exhilarates the vegetable Part of the Creation, and makes Nature herself to smile.

It has an Influence upon deep Grounds, by warming and chearing the Pores of the Earth, when dilated and sodden by too much Wet, and puts the emulgent Fibres of Plants upon seeking their Food.

It helps the Surface of the Ground by attracting or dispelling the Vapours, which would otherwise make it noxious: But more particularly it warms and heats the Ground, and by its powerful Influence, contributes to dissolve the latent Salt, and prepares them for being sucked in by the Fibres of the Plants, which by the same genial Force are put in Action to seek out for their Food.

The *Sun* also exhales all superfluous Moisture, and by its vital Heat comforts the dilated Pores.

The *Sun* diffuses the early Dews, which, if they lay too long on Plants, would rot rather than refresh them: It also presses them into the Nerves, and other analogous Parts. This influential Power operates on the Boughs, Branches, Leaves and Fruit.

The *Sun* also qualifies the Air; which otherwise by its Frigidity would stop the very Course of Nature. And indeed it would be difficult to instance any thing in the whole Circle of *Botanology* that does not participate of a Share of this virtual and diffusive Good.

From what has been said, we may easily account for the Difference of Heat in *Summer* and *Winter*, viz. from the Obliquity of the *Sun's* Rays: This therefore should be well consider'd in the Contrivance of *Stoves*, to preserve the most tender Exotick Plants, which ought to have their Glasses so situated as to receive the *Sun's* Rays in direct Lines as great a Part of the Year as possible: For which Reason the *Stoves* which have upright Glasses in Front, and sloping Glasses over them, are justly preferred to any at present contriv'd. And from hence we see the Advantage of making the back Part and Ceiling of all Greenhouses and *Stoves* as white as possible, since it is evident that the Rays of Light are hereby reflected with much greater Force, and so consequently the Heat is greatly increas'd, which should always be observed in Buildings of this Kind.

From hence also we may learn, that Countries in the same Latitude may be very different in their Heat, according to their Situation in respect to the *Sun's* Rays, or according to the Nature of the Soil in reflecting the Rays with a greater or less Force: So that in preserving Exotick Plants, the Heat which they require can't be exactly determin'd from the Latitude of the Places of their Growth: But the Situation of the Places must also be consider'd, as whether they grew on Hills, Mountains or Valleys; and if on the Side of Hills, which Side in respect to the *Sun*; with several other Observations which ought to be made by such as collect Plants in foreign Countries.

I shall here add a Table of the Shadow of the Sun at the several Seasons of the Year, which was communicated to me by Mr. Timothy Sheldrache of Norwich; by which a Person may more readily see what Effect Walls, Buildings, &c. have in shading the Ground

to several Distances, according as the Sun is more or less elevated above the Horizon; as also how great the Shade will be in Green-houses as the Piers are in Breadth, or the Wall in Front is in Height below the Sashes.

☉ in ♈				☉ in ♉ ♋				☉ in ♊				Latitude 51° 30'			
Degr. of Latit.				Degr. of Latit.				Degr. of Latit.				The Length of the Shadow of a Column of five Feet high at the Time the Sun enters every Sign.			
°	'	"		°	'	"		°	'	"		☉ in	Feet	Feet	Inches
30	—	8	—	10	—	10	—	0	—	17	30	♈	5	2	9
40	—	17	30	20	—	22	30	10	—	37	30	♉	5	3	1
50	—	32	30	30	—	35	—	20	—	57	30	♊	5	3	11½
60	—	47	30	40	—	47	30	30	1	17	—	♋	5	6	6
70	1	7	30	50	1	10	—	40	2	2	30	♌	5	9	7
80	1	40	—	60	1	50	—	50	3	40	—	♍	5	15	5
90	2	37	30	70	2	40	—	—	—	—	—	♎	5	20	—
				80	10	—	—	—	—	—	—	♏	5	—	—

The first three Tables shew the Length of Shadows in the Summer and Winter Solstice, and in the Vernal and Autumnal Equinoxes. Suppose a Mountain, Column, or other Body, whose perpendicular Height is one Degree; the Length of the Shadow from any thing of that Altitude is here shewn in every Degree of Latitude, at the abovemention'd Times, in Degrees and Minutes: And where a shorter Measure than a Mile is required, it is shewn in Seconds. The fourth Table is calculated for the Latitude of 51° 30', which is pretty near that of London. This fourth Table shews the Length of the Shadow made by any perpendicular Body of five Feet Altitude on a Plane, at the Time the Sun enters every Sign of the Zodiac, which at a South Sun will be found very exact on a true Level.

SUPERFICIES of the Ground, &c. is the outward Part or Surface of it.

SURFACE, is the bare Outside of a Body or Superficies.

SYCAMORE; *vide* Acer Majus.

SYMPHYTUM: [Some derive it from *σῦμφυτον*, to grow to, because this Plant is consolidating and vulnerary, and of great Use in causing Flesh to grow again: Others derive it of *συμποιεῖν*, to conglutinate, because if the Leaves or Roots of this Plant are boil'd with Flesh, the Flesh returns again into one Mass; hence it is call'd *consolida major officinarum*.] Comfrey.

The Characters are;

The Flower consists of one Leaf, shap'd like a Funnel, having an oblong Tube, but shap'd at the Top like a Pitcher; out of the Flower-cup (which is deeply cut into five long, narrow Segments) rises the Pointal, attended with four Embryo's, which afterwards become so many Seeds, in Form somewhat like the Head of a Viper, and do ripen in the Flower-cup.

The Species are;

1. **SYMPHYTUM**; *consolida major, femina, flore albo vel pallide luteo*. C. B. P. The greater Female Comfrey, with a white or pale-yellow Flower.

2. **SYMPHYTUM**; *consolida major mas, flore purpureo*. C. B. P. The greater Male Comfrey, with a purple Flower.

3. **SYMPHYTUM**; *majus tuberosa radice*. C. B. P. Greater Comfrey, with a tuberosa Root.

There are some other Species of this Plant which are preserv'd in some curious Botanick Gardens for Variety, but those here mention'd are what I have chiefly observ'd in England.

The first Sort grows wild upon the Sides of Banks and Rivers in divers Parts of England, where it is commonly gather'd to supply the Markets for Medicinal Use. The second Sort is sometimes found wild in England, but is less common than the former; in Holland it is the only Sort I observ'd wild, where it grows in great Plenty on the Sides of the Canals almost every where.

The third Sort I never yet observ'd growing wild, but it is preserv'd in many Gardens for Variety.

All these Plants may be cultivated, either by sowing their Seeds in the Spring, or by parting of their Roots; the latter Way, being the most expeditious, is chiefly practis'd, where they are planted for Use. The best Season for parting their Roots is in Autumn, at which Time almost every Piece of a Root will grow: They should be planted about eighteen Inches asunder, that they may have Room to spread, and will require no farther Care but to keep them clear from Weeds, for they are extream hardy, and will grow upon almost any Soil, or in any Situation.

SYRINGA; [so call'd of *σῦριξ*, a Pipe, because the Branches of this Shrub, the Pith being

being taken out, may serve for making Pipes for Syringes.] The Mock-Orange; *vulgô*.

The Characters are;

The Flower, for the most part, consists of five Leaves, which are plac'd circularly, and expand in Form of a Rose; from whose Flower-cup rises the Pointal, which afterwards becomes a roundish Fruit adhering to the Flower-cup, divided into four Cells, which are full of small Seeds.

The Species are;

1. SYRINGA; *alba, five Philadelphus Athenæi*. C. B. P. The common white Syringa or Mock-Orange.

2. SYRINGA; *flore albo pleno*. C. B. P. The double white Syringa.

3. SYRINGA; *flore albo simplici, foliis ex luteo variegatis*. The strip'd-leav'd Syringa.

4. SYRINGA; *nana, nunquam florens*. The Dwarf Syringa.

The first Sort is very common in most English Gardens, but the second is not quite so plenty, though, indeed, it is a Variety scarce worth observing, since the Flowers are always single where they are produc'd in Bunches; and where they are produc'd singly, they are double: But this so rare, that many times upon a large Shrub there can't be found fix double Flowers.

The variegated Sort is preserv'd in the Gardens of such as are curious in strip'd Plants, tho' there is no great Beauty in it, because when the Plants are vigorous, the Stripes in the Leaves do scarcely appear.

The Dwarf Sort is not worth a Place in a Garden, unless for the Sake of Variety, since it never produces any Flowers.

All these Plants may be easily propagated, by taking off their Suckers in Autumn, (which they produce very plentifully) and planting them out in a Nursery at three Feet Distance Row from Row, and a Foot asunder in the Rows, observing to keep the Ground between them constantly clear from Weeds, as also to dig it up every Spring to loosen it, that the Roots of the Plants may more readily extend themselves. In this Nursery they may remain two Years, by which Time they will be fit to transplant out where they are to remain; which may be into small Wilderness-Quarters, or amongst flowering Shrubs in Clumps, observing to place them with other Sorts of Shrubs of the same Growth, for these seldom do grow above six or seven Feet high in England, and the Dwarf Sort not more than three or four.

They are extream hardy, so may be planted in almost any Soil or Situation, and will require no farther Culture but to take off the Suckers every Year, and cut out the dead Wood, as also to keep them clear from Weeds in Summer, and dig the Ground about their Roots every Winter, which will make them thrive and flower very plentifully. The Season of their Flowering is in May, and in cool Seasons they do continue in Beauty the first Part of June: Their Flowers have a Scent somewhat like those of the Orange-Tree, from

whence it had the Name of Mock-Orange: But if these are plac'd in a close Room, or are smelt to too closely, they have a strong disagreeable Scent, and too powerful for the Ladies; but when they are in the open Air, the Scent is not so affecting.



T A

TAGETES; African or French Marygold.

The Characters are;

The Flower is radiated, consisting of divers Florets, which are plain, and cut into several Segments; but the Disk of the Flower consists of half Florets, which stand upon the Embryo's; the Flower-cup consists of one Leaf, is tubulous, and encloses the Embryo's, which afterwards become angular Seeds, with a Leaf upon the Head of each.

The Species are;

1. TAGETES; *maximus, rectus, flore simplici ex luteo pallido*. J. B. Greatest upright African Marygold, with a single, pale, yellow Flower.

2. TAGETES; *maximus, rectus, flore maximo multiplicato*. J. B. Greatest upright African Marygold, with a large double Flower.

3. TAGETES; *maximus, rectus, flore maximo multiplicato, aurantii coloris*. Greatest upright African Marygold, with a very large double Orange-colour'd Flower.

4. TAGETES; *maximus, rectus, flore maximo multiplicato, sulphureo coloris*. Greatest upright African Marygold, with a very large double Brimstone-colour'd Flower.

5. TAGETES; *maximus, rectus, flore maximo multiplicato, pallide luteo, odorato*. Greatest upright African Marygold, with a very large double Flower, of a pale, yellow Colour, and a sweet Scent.

6. TAGETES; *maximus, rectus, flore maximo multiplicato, pallide luteo & fistuloso*. Greatest upright African Marygold, with a large, double, pale, yellow, and piped Flower, commonly call'd The Quilled African.

7. TAGETES; *Indicus, medius, flore simplici, luteo-pallido*. J. B. Indian middle French Marygold, with a single, pale, yellow Flower.

8. TAGETES; *Indicus, medius, flore luteo, multiplicato*. H. L. The middle French Marygold, with a double yellow Flower.

9. TAGETES; *Indicus, minor, simplici flore, five Caryophyllus Indicus five flos Africanus*. J. B. Lesser or Common French Marygold, with a single Flower, call'd Indian Clove July-flower.

10. TAGETES; *Indicus, minor, multiplicato flore*. J. B. Double French Marygold; *vulgô*.

11. TAGETES; *Indicus, flore simplici, fistuloso*. H. L. Single French Marygold, with a piped Flower.

12. TAGETES;

12. *TAGETES*; *Indicus, flore fistuloso, duplicato*. H. L. Double French Marygold, with a piped Flower.

13. *TAGETES*; *Indicus, minimus, flore sericea bifute obfita*. H. L. The least French Marygold, with a soft hairy Flower.

All these Plants are annual, so must be propagated from Seeds every Spring, which may be sown upon a moderate Hot-bed in March; and when the Plants are come up, they should have Plenty of fresh Air, for if they are drawn too much, they will not afterward become handsome, notwithstanding they have all possible Care taken of them. When they are about three Inches high, they should be transplanted on a fresh Hot-bed, which may be arched over with Hoops, and covered with Mats, (for these Plants are hardy enough to be brought up without Glasses): In this Bed they should be planted about six Inches asunder each Way, observing to water and shade them until they have taken Root; but as the Plants do acquire Strength, so they should be inur'd to bear the open Air by Degrees; and about the Beginning of May, they should be taken up, with a Ball of Earth to the Root of each Plant, and plac'd in a Nursery in a warm Situation, about eighteen Inches asunder, observing to water and shade them until they have taken Root, and in very dry Weather, the Waterings should be repeated: In this Nursery they may remain until their Flowers appear, so as to distinguish those with double Flowers: which may be taken up with a Ball of Earth to each Plant, and planted into the Borders of the Parterre Garden, or into Pots, for furnishing the Courts, &c. where the several Varieties being intermix'd with other annual Plants, do afford an agreeable Variety.

Those with single Flowers should be pull'd up, and thrown away as good for little, because the Seeds produc'd from them will rarely produce double Flowers; therefore great Care should be taken to save only the Seeds of those whose Flowers are very double of every kind, from which there will always be a good Quantity of double ones produc'd, tho' from the very best Seeds there will always be many single Flowers; but the small Sorts do always produce a greater Number of double Flowers than the large, which are more apt to degenerate.

These Plants have a strong, disagreeable Scent, especially when handled; for which Reason they are not so greatly esteem'd for planting near Habitations: but the Flowers of the sweet-scented Sort being more agreeable, are mostly coveted to plant in small Gardens. All these Sorts do begin to flower in May, and continue all the latter Part of the Year, until the Frost prevents their Flowering: for which, together with the little Trouble requir'd in their Culture, they have greatly obtain'd in most English Gardens.

TAMARINDUS; [so call'd of *Tamur*, a *Date*, because its Fruit does somewhat resemble a *Date*.] The Tamarind-Tree.

The Characters are;

The Flower consists of several Leaves, which are so plac'd as to resemble a papilionaceous one in some measure; but these expand circularly: From whose many-leav'd Flower-cup rises the Pointal, which afterwards becomes a flat Pod, containing many flat angular Seeds, surrounded with an acid, blackish Pulp.

We have but one Species of this Tree; viz.

TAMARINDUS. Raii Hist. The Tamarind-Tree.

There are some who imagine the Tamarind-Tree of the East-Indies, and that of the West-Indies to be different, but I don't remember to have seen them distinguish'd by any Botanical Author; though, indeed, from the different Appearance of the Pods, they seem very different; for the Pods which I have seen of the East-Indian Sort were very long, and contain'd six or seven Seeds in each; whereas those of the West-Indies do rarely contain more than three or four: but from the Plants which I have rais'd from both Sorts of Seeds, I can't distinguish them asunder as yet.

These Trees do grow to a great Magnitude in their native Countries; but in Europe they are preserv'd as Curiosities by those who are Lovers of rare Plants.

They are easily propagated by sowing their Seeds on a Hot-bed in the Spring; and when the Plants are come up, they should be planted each into a separate small Pot fill'd with light rich Earth, and plung'd into a Hot-bed of Tanners-Bark, to bring 'em forward, observing to water and shade them until they have taken Root; and as the Earth in the Pots appears dry, so they must be water'd from time to time, and should have Air given to them in Proportion to the Warmth of the Season, and the Bed in which they are plac'd: When the Pots in which they are planted are fill'd with their Roots, the Plants should be shifted into Pots of a larger Size, which must be fill'd up with rich light Earth, and again plung'd into the Hot-bed, giving them Air, as before, according to the Warmth of the Season: But in very hot Weather the Glasses should be shaded with Mats in the Heat of the Day, otherwise the Sun will be too violent for them through the Glasses: Nor will the Plants thrive if they are expos'd to the open Air, even in the warmest Season, so that they must be constantly kept in the Bark-stove both Winter and Summer, treating them, as hath been directed, for the *Anana's*, with whose Culture they will thrive exceedingly.

These Plants, if rightly manag'd, will grow very fast, for I have had 'em upwards of three Feet high in one Summer from Seed, and had one Plant which produc'd Flowers the same Season it was sown; but this was accidental, for I have never since had any of them flower, altho' I have several Plants of different Ages, one of which is five Years old, and about seven Feet high, with a large spreading Head.

TAMA-

TAMARISCUS: The Tamarisk-Tree.

The Characters are ;

The Flowers are rosaceous, consisting of several Leaves, which are plac'd orbicularly ; from whose Flower-cup rises the Pointal, which afterwards becomes a Pod (somewhat like those of the Sallow) which opens into two Parts, and contains several downy Seeds.

The Species are ;

1. **TAMARISCUS ; Narbonensis.** Lob. Icon. The French or narrow-leav'd Tamarisk-Tree.

2. **TAMARISCUS ; Germanica.** Lob. Icon. The German Tamarisk.

These Trees are preserv'd in the Gardens of those who are curious in collecting the various kinds of Trees and Shrubs ; but they have not much Beauty to recommend them, for their Branches are produc'd in so straggling a manner, as not by any Art to be train'd up regularly, and their Leaves are commonly thin upon the Branches, and do fall away in Winter, so that there is nothing to recommend them but their Oddness.

They may be easily propagated, by laying down their tender Shoots in the Spring, or by planting Cuttings in an East Border at that Season, which, if supply'd with Water in dry Weather will take Root in a short time, but they should not be remov'd until the following Spring ; at which Time they may be either plac'd in a Nursery, to be train'd up two or three Years, or else into the Quarters where they are design'd to remain, observing to mulch their Root, and water them according as the Season may require, until they have taken Root ; after which, the only Culture they will require, is, to prune off the straggling Shoots, and keep the Ground clean about them.

These Plants delight in a sandy Soil, not over rich, and should be plac'd amongst Shrubs of a middling Growth, for they rarely grow above fifteen or sixteen Feet high in England, but are very hardy in respect to Cold.

TAMNUS ; the Black Briony.

The Characters are ;

It is Male and Female in different Plants ; the Flowers of the Male Plant consist of one Leaf, and are Bell-shap'd, but these are barren ; the Embryo's are produced on the Female Plants, which afterwards becomes an oval Berry, including roundish Seeds. To these Notes should be added, that these Plants have no Claspers, as the White Briony hath.

We have but one Species of this Plant in England, viz.

TAMNUS ; racemosa, flore minore luteo palefcente. Tourn. The common Black Briony.

This Plant is rarely cultivated in Gardens, but grows wild under the Sides of Hedges in divers Parts of England, and is there gather'd for medicinal Use. It may be easily propagated by sowing the Seeds soon after they are ripe, under the Shelter of Bushes, where, in the Spring, the Plants will come up, and spread their Branches over the Bushes, and support themselves, requiring no farther Care ;

and their Roots will abide many Years in the Ground, without decaying.

TANACETUM ; Tanfy.

The Characters are ;

It hath a flosculous Flower, consisting of many Florets, divided into several Segments sitting on the Embryo, and contained in a squamous and hemispherical Empalement ; the Embryo afterwards becomes a Seed, not at all downy. To these Notes must be added, thick Flowers gather'd into a kind of Head.

The Species are ;

1. **TANACETUM ; vulgare luteum.** C. B. P. Common Tanfy.

2. **TANACETUM ; foliis crispis.** C. B. P. Curled or Double Tanfy.

3. **TANACETUM ; vulgare, foliis variegatis.** Common Tanfy with strip'd Leaves.

4. **TANACETUM ; vulgare luteum maximum.** Boerb. Ind. The largest Common Tanfy.

5. **TANACETUM ; Africanam, arborescens, foliis Lavendulae multifido folio.** H. Am. African shrubby Tanfy with Leaves like the multifid Lavender.

The first and second Sorts are very common in England, being promiscuously cultivated in Gardens for the Use of the Kitchen ; but the first should be propagated for medicinal Use. The third Sort is a Variety of the first, which is by some preserved for the Sake of its variegated Leaves. The fourth Sort is very like the Common in Appearance, but is much larger, and has less Scent.

All these Sorts are easily propagated by their creeping Roots, which if permitted to remain undisturb'd, will in a short Time overspread the Ground where they are planted ; so that the Slips should be placed at least a Foot asunder, and in particular Beds, where the Paths round them may be often dug, to keep their Roots within Bounds. They may be transplanted either in Spring or Autumn, and will thrive in almost any Soil or Situation.

The common Tanfy is greatly used in the Kitchen early in the Spring, at which Season that which is in the open Ground, or especially in a cold Situation, is hardly forward enough to cut ; so that where this is much wanted at that Season, it is the best Way to make a gentle Hot-bed in December, and plant the old Roots thereon, without parting 'em, and arch the Bed over with Hoops, to cover it with Mats in cold Weather, by which Method the Tanfy will come up in January, and be fit to cut in a short Time after.

The fifth Sort was brought from the Cape of Good-Hope, and is preserved in the Gardens of those who are curious in collecting exotick Plants. This may be propagated by planting Cuttings or Slips, during any of the Summer Months, upon a Bed of light rich Earth, observing to water and shade 'em until they have taken Root, after which they may be taken up, and planted in Pots filled with light fresh Earth, placing them in a shady Situation until they

they have taken new Root, and then they may be exposed in an open Place, amongst other exotick Plants, until the Beginning of *October*, when they must be removed into the Green-house, observing to place 'em in the coolest Part thereof, and as near the Windows as possible, that they may enjoy the free Air in mild Weather, otherwise they will draw up weak, and be liable to grow mouldy, and decay.

They must also be frequently watered, but in very cold Weather they must not have too much Water given them at each Time, tho' in *Summer* they should have it in Plenty. With this Management (together with observing to shift 'em into larger Pots, as they shall require it) the Plants will grow large, and produce a great Quantity of Flowers, which commonly appear early in the *Spring*, and thereby greatly add to the Variety of the Green-house.

TAN or **TANNERS BARK**, is the *Bark* of the Oak-tree, chopped and ground into coarse Powder, to be used in Tanning or Dressing of Skins; after which it is of great Use in Gardening: First, by its Fermentation (when laid in a Body), which is always moderate, and of a long Duration, which renders it of great Service to Hot-beds; and secondly, after it is well rotted, it becomes excellent Manure for all Sorts of cold stiff Land, upon which one Load of *Tan* is better than two of the best rotten Dung, and will continue longer in the Ground.

The Use of *Tan* for Hot-beds has not been very many Years known in *England*, and was brought over first from *Holland*, where it had been long used for those Purposes: I have been informed that it was first used in *England* for raising Orange-trees, which is about the Beginning of King *William's* Reign, but it was disused long after that, and it is within fifteen or sixteen Years past, that it was again brought into Use, for raising the Pine-Apple; since which Time it has yearly grown more in Use for Hot-beds, and I doubt not but in a few Years it will be generally used for those Purposes, where-ever it can be procured easily.

There are commonly two or three Sorts of *Tan*, which are ground into Powder of different Sizes, some being in very gross Pieces, and others are ground very fine; these are different in their Effects when laid to ferment, for the small Sort will heat more violently, but will lose its Heat in a short Time, but the large Sort being moderate in Fermentation, does continue its Heat a long Time: So that whoever makes a Hot-bed of *Tan*, must proportion a Mixture of each Sort according as they would have their Beds work; for if they intend to have a moderate Heat, and can stay a Fortnight or three Week, for its beginning to ferment, they should use but very little small *Bark*: but where the Heat is wanted sooner, there should be a larger Proportion of the small *Bark*.

This *Tan* should be taken in a Fortnight's Time after it comes out of the Pit, and laid up in a round Heap for a Week, to drain; (especially if it be in *Winter* or *Spring*, while the Season is moist) after which it may be put into the Trench where the Hot-bed is design'd, which should be brick'd on the Sides quite round, to prevent the Earth from mixing with the *Bark*. These Trenches should be proportioned to the Size of the Frames which are to cover them, and the Depth in the Ground according to the Moisture of the Place where they are situated; for if the Ground is very wet, the Bed should be rais'd above the Surface of the Ground, because if ever the Water rises into the *Bark*, it will cool it so much as not to be retrieved again to its former Heat, without taking it out of the Trench again, and fresh mixing it up.

The Thickness which the *Bark* should be laid in the Trench, must not be less than three Feet, and the Width four Feet; for where it is laid in a less Body, it seldom heats, and if it is forced by laying hot Dung under it (as is sometimes practis'd), the Heat will soon decay: In laying the *Bark* into the Trench, you should be careful to stir up every Part of it, that it may not settle in Lumps; as also to press it down gently, but by no Means tread or beat it down too close, which will prevent its heating. Then the Glasses should be placed over the Bed immediately after it is finished, which should be kept close down, in order to draw a Heat in the *Bark*, and to prevent Wet from falling thereon; in a Fortnight's Time after the *Bark* will begin to heat, and when it is found of a due Temper, the Plants may be removed into it.

A Hot-bed well prepared with this *Tan*, will continue a moderate Heat upward of six Months, and there being very little Steam arising from it, in comparison to Horse-dung, renders it much better for the Growth of all Sorts of Plants; and when the Heat begins to decay, if the *Tan* be fresh stirred up, and a little new added to it, it will heat again and continue some Months longer. The farther particular Directions for the Management of these Hot-beds, being already exhibited under the Article of *Hot-beds*, the Reader is desired to turn back to that for farther Instructions.

TARRAGON; *vide* *Draco Herba*.

TAXUS, [so called of *τάξα*, *Poisons*, because this Tree in old Time was used in compounding Poisons, in warm Climates.] The Yew-Tree.

The Characters are;

It hath amentaceous Flowers, which consist of many Apices, for the most part shap'd like a Mushroom, and are barren; but the Embryo's (which are produced at remote Distances on the same Tree) do afterwards become hollow, Bell-shap'd Berries, which are full of Juice, and include Seeds somewhat like Acorns, having, as it were, a little Cup to each.

The Species are ;

1. *TAXUS* ; *f. B.* The common Yew-tree.

2. *TAXUS* ; *folio latiori, magisque splendente.* Boerb. Ind. Yew-tree with a broader and more shining Leaf.

3. *TAXUS* ; *foliis variegatis.* H. R. Par. The Yew-tree with strip'd Leaves.

The two first Sorts are often promiscuously cultivated in Gardens, without Distinction ; but the third is preserved by some for the Sake of its variegated Leaves : Though there is very little Beauty in them ; for during the Summer Season, when the Plants are in Vigour, the Stripes in the Leaves : are hardly to be perceived, but in Winter they are more obvious ; however, the Stripe being rather a Blemish than any real Beauty, it is hardly worth preserving.

There is hardly any Sort of ever-green Tree which has been so generally cultivated in the English Gardens, upon the Account of its being so useful, as to be with Ease reduced into any Shape the Owner pleas'd, and it may be too often seen, especially in old Gardens, what a wretched Taste of Gardening did generally prevail, from the monstrous Figures of Basts, &c. we find these Trees reduced into ; but of late this Taste has been justly exploded by many Persons of superior Judgment : For what could be more absurd than the former Methods of planting Gardens ? where, in the Part next the Habitation, were crowded a large Quantity of these and other Sorts of ever-green Trees, all of which were sheered into some trite Figure or other ; which besides the obstructing the Prospect from the House, occasioned an annual Expence to render the Trees disagreeable. For there never was a Person who had consider'd the Beauty of a Tree in its natural Growth, with all its Branches diffus'd on every Side, but must acknowledge such a Tree infinitely more beautiful than any of those shorn Figures, so much studied by Persons of a grovelling Imagination.

The only Use I would recommend this Tree for in Gardens, is to form Hedges for the Defence of exotick Plants, for which Purpose it is the most proper of any Tree in Being : The Leaves being small, the Branches are produced very closely together, and if carefully shorn, they may be render'd so close, as to break the Winds better than any other Sort of Fence whatever, because they will not be reverberated, as against Walls, Pales, and other close Fences, and so consequently are much to be preferr'd for such Purposes.

These Trees may be easily propagated by sowing their Berries in Autumn, as soon as they are ripe (without clearing 'em from the Pulp which surrounds them, as hath been frequently directed) upon a Bed of fresh undung'd Soil, covering 'em over about half an Inch thick with the same Earth.

In the Spring the Bed must be carefully clear'd from Weeds, and if the Season prove dry, it will be proper to refresh the Bed with

Water now and then, which will promote the Growth of the Seeds, many of which will come up the same Spring, but others will remain in the Ground until the Autumn or Spring following ; but where the Seeds are preserved above Ground 'till Spring before they are sown, the Plants do never come up 'till the Year after, so that by sowing the Seeds as soon as they are ripe, there is many times a whole Year saved.

These Plants, when they come up, should be constantly clear'd from Weeds, which if permitted to grow amongst 'em, would cause their Bottoms to be naked, and many times destroy the Plants when they continue long undisturb'd.

In this Bed the Plants may remain two Years ; after which, in the Spring of the Year, there should be a Spot of fresh undung'd Soil prepared, into which the Plants should be removed the Beginning of April, placing 'em in Beds about four or five Feet wide, planting them in Rows about a Foot asunder, and six Inches Distance from each other in the Rows ; observing to lay a little Mulch upon the Surface of the Ground about their Roots, as also to water them in dry Weather until they have taken Root, after which they will require no farther Care, but to keep 'em clear from Weeds in Summer, and to trim them according to the Purpose for which they are design'd.

In these Beds they may remain two or three Years, according as they have grown, when they should be again removed into a Nursery, placing 'em in Rows at three Feet Distance, and the Plants eighteen Inches asunder in the Rows, observing to do it in the Spring, as was before directed, and continue to trim 'em in the Summer Season, according to the Design for which they are intended ; and after they have continued three or four Years in this Nursery, they may be transplanted where they are to remain, always observing to remove 'em in the Spring.

These Trees are very slow in growing, but yet there are many very large Trees upon some barren cold Soils in divers Parts of England ; the Timber of these Trees is greatly esteem'd for many Uses.

TEREBINTHUS, [is derived of *τρίβω*, *Cicer*, because the Fruit of this Tree resembles them in Shape.] The Turpentine Tree.

The Characters are ;

It is Male and Female in different Plants ; the Flowers of the Male have no Petals, but consist of a Number of Stamina with Chives ; the Embryo's which are produced on the Female Trees do afterwards become an Oval Fruit with a hard Shell, inclosing one or two oblong Kernels. To these Notes must be added ; the Leaves are pennated, or winged, which are produced by Pairs opposite, and end in a single Lobe.

The Species are ;

1. *TEREBINTHUS* ; *vulgaris.* C. B. P. The common Turpentine tree.

2. *TERE-*

2. *TEREBINTHUS*; *Indica*, *Theophrasti*, *Pistachia Diascoridis*. *Lob. Adv.* The *Pistachia*-tree, *vulgô*.

These Trees are very common in several Islands of the *Archipelago*, from whence there are annually great Quantities of the *Pistachia* Nuts brought into *England*, which do easily rise if sown on a Hot-bed in the *Spring*; so that the Trees of this Kind are much more common in *England* than are those of the first Sort, whose Fruit are rarely brought over fresh: Besides, the Shell of these Nuts are much harder than those of the *Pistachia*, so that many times the Plants do not come up until the second Year, which may also have contributed to the present Scarcity of the Plants in *England*.

The Seeds (or Nuts) of both these Trees should be sown in Pots fill'd with fresh, light Earth, and plung'd into a moderate Hot-bed, observing to refresh the Earth with Water frequently, as it may have Occasion; and when the Plants are come up (which those of the *Pistachia* will do in six Weeks after sowing) they should be inur'd to bear the open Air by Degrees, into which they must be remov'd the Beginning of *June*, placing them where they may be screen'd from the Violence of the Winds, in which Situation they may remain until *October*, when they should be remov'd either into a common Hot-bed Frame, or else into a Green-house, where they may be defended from hard Frost, but should have as much free Air as possible in mild Weather, and must be frequently refresh'd with Water.

In *March* following these Plants should be remov'd, and each planted in a separate Pot, filled with fresh light Earth, and as the *Spring* advances, so they should be again remov'd into the open Air, and placed amongst other exotick Plants, observing to water them frequently in dry Weather; and when their Roots are confin'd by the Smalness of the Pots, they must be shifted, being careful not to break the Earth off from their Roots, which will greatly injure them, unless it be done before the Plants begin to shoot in the *Spring*, for at that Season they may be transplanted with as much Safety as any other deciduous Trees.

In this Manner these Plants should be treated for three or four Years, while young, after which Time the *Pistachia*'s may be planted into the full Ground, observing to place them in a warm Situation and dry Soil, where they will endure the Cold of our ordinary *Winters* very well, as may be seen by a very large Tree of this Kind, now growing in the Gardens of the Earl of *Peterborough*, at *Parson's-Green* near *Fulham*, which produces Abundance of Fruit, without any manner of Care. Nor do I believe, but that the common *Turpentine-tree* would endure the Cold of our Climate, if after the Plants have acquired Strength, they are planted against a good Wall upon a dry Soil; for much Wet about the Roots of these Trees in *Winter*, is very often the Occasion of their rotting, whereby the Trees are destroy'd.

TERGIFOETUS PLANTS, are such as bear their Seeds on the Backsides of their Leaves.

TERRASSES: A *Terrass* is a small Bank of Earth, rais'd and trimm'd according to Line and Level, for the proper Elevation of any Person that walks round a Garden, that he may have a better Prospect of all that lies round him; and these Elevations are so necessary, that those Gardens that have them not, are deficient.

When *Terrasses* are rightly situated, they are great Ornaments to such Gardens as have them, for their Regularity and Opening, especially when they are well built, and beautified with handsome Stairs and fine Ascents.

Sometimes under them are made Vaults, Grotto's, and Cascades of Water, with an Order of Architecture, and a great many Statues in Niches; and on the Coping above are set Vases and Flower-pots, orderly rang'd and dispos'd.

There are several Kinds of *Terrass* Walks:

1. The Great *Terrass*, which lies next to the House.

2. The Side or Middle *Terrass*, which is commonly cut above the Level of the *Parterre*, *Lawn*, &c.

3. Those *Terrasses* which encompass a Garden.

4. Those *Terrasses* which lie under one another, being cut out of a large Hill; and these are different one from another, in some respect or other.

As to the Breadth of Side *Terrasses*, this is usually decided by its Correspondence with some Pavilion, or some little Jettee of Building; but most of all by the Quantity of Stuff that is to spare for those Purposes.

The Side *Terrass* of a Garden ought not to be less than twenty Feet, and but very seldom wider than forty.

As for the Height of a *Terrass*, some allow it to be but five Feet high, but others more or less according to their Fancies; but the most exact Persons never allow above three Feet and a half; and in a small Garden, and a narrow *Terrass* Walk, three Feet, and sometimes two Feet and a half high, are sufficient for a *Terrass* eighteen Feet wide; and two Feet nine Inches is sufficient for a *Terrass* of twenty Feet wide; but when the Garden is proportionably large, and the *Terrass* is thirty or forty Feet wide, then it must be at least three Feet, or three Feet and a half high.

The noblest *Terrass* is very deficient without Shade; for which Elm-trees are very proper: For no Seat can be said to be compleat, where there is not an immediate Shade almost as soon as out of the House; and therefore these shady Trees should be detach'd from the Body and Wings of the Edifice.

Terrasses should be planted rather with Elm or good Oak, than with Yew or Holly, that must be always clipping.

The Distance of the Elms across will be about twenty Feet, and they may be plac'd thirty Feet asunder in Lines.

TERRENE; Earthy, or compos'd of Earth.

TERRESTRIAL; Earthy, or that belongs to Earth.

TETRAPETALOUS FLOWER, is one which is compos'd of only four single Flower-leaves, called *Petala*.

TEUCRIUM, [takes its Name of King *Teucer*, who was the first amongst the Antients who brought this Plant into Use.] Tree Germander.

The Characters are;

The Flower-cup is divided into five Parts at the Top, but is of the Bell-shap'd Kind; the Flower has no Galea or Crest, but instead thereof, the Stamina occupy the upper Part; the Beard, or Lower-lip, is cut into five Parts, the middle Segment being larger, is hollowed like a Spoon; in the Center of the Flower rises the Pointal, attended by four Embryo's, which afterwards become so many Seeds, shut up in a Husk, which was before the Flower-cup. To these Notes should be added, the Flowers are produc'd from the Wings of the Leaves.

The Species are;

1. **TEUCRIUM**; *multis.* J. B. Common Tree Germander.
2. **TEUCRIUM**; *Baticum.* Clus. Hist. Spanish Tree Germander.
3. **TEUCRIUM**; *Baticum, calice campanulato, folio eleganter variegato.* Boerb. Ind. Spanish Tree Germander with a strip'd Leaf.

There are some other Species of this Plant, which are preserved in curious Botanick Gardens for Variety; but as they are of little Use or Beauty, it would be needless to enumerate them.

The first Sort here-mention'd was formerly preserved in Green-houses with great Care, but of late Years it hath been planted out into the open Air, and is found hardy enough to endure the Cold of our severest Winters without Shelter, provided it be planted on a dry Soil.

This may be propagated by planting Cuttings in the Spring, on a Bed of fresh light Earth, observing to shade and water them until they have taken Root, after which they will require no farther Care, but to keep them clear from Weeds until the following Spring, when they may be transplanted out into the Places where they are to remain, being careful in removing them, not to shake off all the Earth from their Roots, as also to water them until they have taken fresh Root, after which the only Care they require, is to keep the Ground clean about them, and to prune off such Shoots as are ill situated, whereby their Heads will appear more regular.

The Spanish Sort is tenderer than the former, though that will endure the Cold of our

ordinary Winters, if planted on a dry Soil, and in a warm Situation; but in a severe hard Frost it is often destroy'd, for which Reason the Plants are generally preserved in Pots, and removed into the Green-house in Winter. This is propagated in the same Manner as the former.

The Sort with strip'd Leaves is less common than the plain; and is valued by those that delight in variegated Plants. This is somewhat tenderer than the plain Sort, but may be propagated and preserved in the same Manner, only observing to place it in a warmer Part of the Green-house in Winter.

There is no very great Beauty in these Plants; but they are preserved for the sake of Variety, by those who are curious in collecting the various Kinds of exotick Plants.

THALICTRUM, [this Name is ancient, and written in a two-fold manner; in the Manuscripts *Θαλίτρον* and *Θαλίχτρον*, but now it has obtain'd the Name of *Thalictrum* among all the Moderns, of *θαλλο*, to grow green: It was anciently us'd at Weddings; or because of its green Leaves adorning Gardens, it is also call'd *πύραυρον*, i. e. because some Botanists have classed this Plant with *Rues*.] Meadow Rue.

The Characters are;

The Flower consists of several Leaves placed orbicularly, which expand in Form of a Rose, in the Middle of which arise numerous Clusters of Chives, encompassing the Pointal, which afterwards becomes a Fruit, in which are collected, as in a little Head, the Capsules, which are sometimes winged and sometimes without Wings, each containing one Seed, for the most part oblong.

The Species are;

1. **THALICTRUM**; *Alpinum, aquilegiæ foliis, florum staminibus purpurascens.* Tourn. Alpine Meadow Rue with Columbine Leaves, and the Chives of the Flower of a purplish Colour, commonly called the Feather'd Columbine.
2. **THALICTRUM**; *Alpinum majus, aquilegiæ foliis, florum staminibus albis, caule viridi.* Tourn. Greater Alpine Meadow Rue with Columbine Leaves, white Chives to the Flowers, and a green Stalk.
3. **THALICTRUM**; *Canadense, caule purpurascens, aquilegiæ foliis florum staminibus albis.* Tourn. Canada Meadow Rue with a purplish Stalk, Columbine Leaves, and white Chives to the Flower.
4. **THALICTRUM**; *Americanum minus.* Park. Theat. Lesser American Meadow Rue.

There are many other Species of this Plant, which are preserved in Botanick Gardens for Variety, some of which are Natives of England, but those above-mentioned are all the Sorts which I have observed to be cultivated in the Flower-Gardens for their Beauty. All these Sorts are commonly known by the Name of *Feather'd* or *Spanish Columbine* among the Gardeners, which Names, I suppose, they received

ceived from the Similitude that the Leaves of these Plant bear to those of Columbine, though their Flowers are very different therefrom.

These Plants are propagated by parting their Roots; the best Time for this Work is in *September*, when their Leaves begin to decay, that they may take fresh Root before the Frost comes on to prevent them. They should also be planted in a fresh light Soil, and have a shady Situation, in which they will thrive exceedingly, though they may be planted in almost any Soil or Situation, provided it be not too hot and dry. These Roots should not be parted or removed oftener than every other Year, but if they are permitted to stand three Years, they will flower much stronger for it.

They may also be propagated by sowing their Seeds on an East Border, soon after they are ripe, observing to keep the Ground clear from Weeds; and the following *Spring* the Plants will come up, when they should be frequently refresh'd with Water, and constantly kept clean from Weeds; the *Autumn* following they may be planted out into Nursery-beds, about five or six Inches asunder, where they may remain until they have Strength enough to flower, when they should be removed into the Borders of the Flower-Garden, placing them in the middle Line among Plants of large Growth, allowing them Room, otherwise they will spread over whatever Plants are near them.

These Plants flower the Beginning of *June*, and if the Season be moderate they will continue in Beauty a long Time: This, together with their being hardy Plants, which require little Culture, renders them worthy of a Place in every good Flower-Garden; and their Flowers are very proper to intermix with others for Basons to adorn Halls, Chimnies, &c. in the *Summer* Time.

THAPSIA, [so call'd of the Island *Thapsus*, where it grew in Plenty.] The Deadly Carrot.

There are several *Species* of this Plant, which are kept in Botanick Gardens, but as they are Plants of little Beauty, so it is not worth while to enumerate them in this Place; but whoever has a mind to propagate them, may do it in the manner directed for *Smyrneum*; which see.

THERMOMETER, [*θερμῆμετρον* of *θερμῆ*, Heat, and *μετρον*, to measure.] An Instrument shewing, or rather measuring the Increase and Decrease of the Heat and Cold of the Air.

Of which there are various Kinds; the Constructions, Defects, Theories, &c. whereof are as follow.

The Construction of a Thermometer depending on the Rarefaction of the Air.

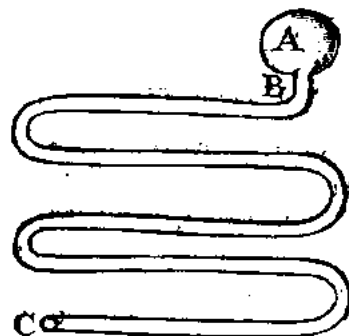
In the Tube C F, to which is fasten'd a Glass Ball, A C, is put a Quantity of common

Water, mix'd with *Aqua Regia*, to prevent its freezing; and the Mixture ting'd with a Solution of Vitriol, to give it a Greenness. In filling the Tube, Care is taken that there be so much Air left in the Ball and Tube, as that when at its greatest Condensation, in the Middle of *Winter*, it may just fill the Ball; and yet in its greatest Rarefaction in *Summer*, may not drive all the Liquor out of the Tube. To the other Extreme of the Tube is fasten'd another Glass Ball, E F, open to the Air at F. On each Side the Tube is apply'd the Scale B D, divided into any Number of equal Parts.

Now, as the ambient Air becomes warmer, the Air in the Ball and the Top of the Tube expanding, will drive the Liquor into the lower Ball, and consequently its Surface will descend; on the contrary, as the ambient Air grows colder, that in the Ball becoming condensed, the Liquor will ascend.

The Construction of the Mercurial Thermometer

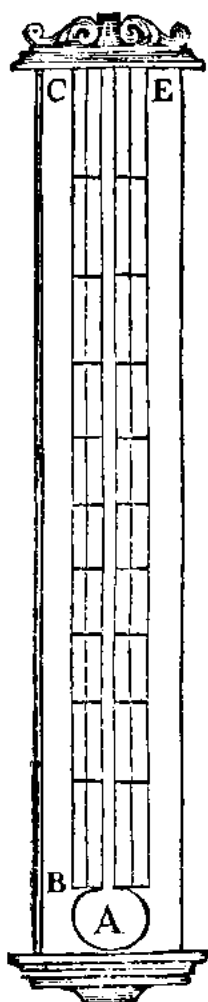
In the same Manner, and with the same Caution as before, put a little Quantity of Mercury, not exceeding the Bigness of a Pea, into a Tube B C, thus bent with Wreaths, that taking up the less Height, it may be the more manageable, and less liable to Harm; divide this Tube into any Number of equal Parts to serve for a Scale.



Here the Approaches of the Mercury towards the Ball A will shew the Increases of the Degree of Heat. The Reason is the same as in the former.

But both these Instruments are defective in this, that they are liable to be acted on by a double Cause: For not only a Decrease of Heat, but also an Increase of Weight of the Atmosphere will make the Liquor rise in the

one, and the Mercury in the other; and on the contrary, either an Increase of Heat, or Decrease of Weight of the Atmosphere will make it descend.



There being some Inconveniences attending the *Thermometers* just describ'd; another has been attempted, that should measure Heat and Cold by the Rarefaction and Condensation of Spirits of Wine, tho' that be vastly less than that of Air, and consequently the Alterations in the Air likely to be much less sensible.

The Structure of this *Thermometer* is this: On some little Pieces of *Turmeric* is poured a Quantity of Spirit of Wine, which hereby receives a red Tincture; this being done, the Spirit of Wine is filtrated again through a brown Paper, that the coarser Particles of the Root may be separated therefrom: With the Spirit thus tinged and prepar'd, they fill a Glass Ball with a Tube; and that all the Spirit may not descend in *Winter* into the Ball, it is convenient to put the Ball into a Lump of Snow mix'd with Salt; or if the Instru-

ment be to be made in *Summer* into Spring Water, impregnated with Salt-peter; and that the condens'd Spirit may shew how far it will retire in the extremest Cold.

If it be still at too great a Distance from the Ball, part of it is to be taken out; and that the Tube mayn't be much longer than needs, it is convenient to immerge the Ball, fill'd with its Spirit in boiling Water, and to mark the farthest Point to which the Spirit then rises.

At this Point the Tube is to be hermetically sealed by the Flame of a Lamp, and at the Sides is to be added a Scale, as in the former *Thermometers*.

Now the Spirit of Wine rarefying and condensing very considerably, as the Heat of the ambient Air increases, the Spirit will dilate, and consequently will ascend in the Tube; and as the Heat decreases, the Spirit will descend, and the Degree or Quantity of Ascent and Descent will be seen in the Scale.

Yet as the *Ratio* of Yesterday's Heat to To-day's is not hereby discover'd, this Instrument is not strictly a *Thermometer* any more than the former.

Here it is to be observ'd;

1. That as the natural Gravity of the Liquor makes it tend downwards, so it resists its Ascent out of the Ball into the Tube, and that the more as it rises higher; for which Reason it were best to have the Tube horizontal.

2. Since there must of Necessity be some Air left in the void Part of the Tube over the Liquor, that Air, by its Elasticity, will tend downwards, and of consequence will resist the Rise of the Liquor, and be compress'd by it as it does rise; its Elasticity therefore is thus increas'd.

3. Since it is found from Experience, that a less Degree of Heat is communicated more easily to the Spirit of Wine in the Ball than a greater, the Rarefactions of the Spirit of Wine are not proportionable to their producing Causes; especially a greater Degree of Heat finds more Liquor in the Tube than a less does, to which, notwithstanding, the Heat may be more easily communicated than to that stagnating in the Ball.

On these Accounts, this last *Thermometer*, call'd the *Florentine Thermometer*, (because contriv'd by the *Academists del Cimento*) tho' it is that which is in common Use, is far from being an accurate Measure of Heat, &c. To which may be added, what Dr. Halley observes in the *Philosophical Transactions*, That he has learn'd from those that have kept Spirit of Wine long, that it loses part of its expansive Force in Course of Time.

Various Authors have propos'd various Methods for finding a fix'd Point or Degree of Heat and Cold, from which to account for the other Degrees, and adjust the Scale; so that Observations made at the same or different Times, in different Places, may be compar'd together.

Some note the Place the Liquor is at in *Winter*, when Water begins to freeze; and again that in *Summer*, when Butter plac'd near the Ball of the *Thermometer* melts: The intermediate Space they divide into two equal Parts; the middle Point whereof answers in their Graduation to temperate Heat; and each Moiety they subdivide into ten Degrees, adding four other equal Degrees on each of the two Extreams.

But this Method supposes the same Degree of Heat and Cold to answer to the freezing of all Water, and the melting of all Butter, as also that all *Thermometers* receive the same Impressions from the same Degree of Heat: all which are contrary to Experience.

Others advise, That the Ball of the *Thermometer* be put in a Quantity of Snow and Salt, and the Point the Liquor is at to be noted; and that thence the *Thermometer* be remov'd into a deep Cave or Cellar, whither no external Air reaches, so that the Liquor receiving the Action of the temperate Air, may shew the Degree of temperate Heat. And lastly, they divide the intermediate Space into fifteen or more equal Parts, which they continue beyond each Extreme: But this Method is liable to the like Inconvenience with the former.

Dr. Halley assumes that for a fix'd Degree of Heat, where Spirits of Wine begin to boil; but there is reason to suspect this too, of being precarious: Tho' after him, M. Amontons retains the Degree of Heat, answering to boiling Water, for the graduating his mercurial *Thermometer*. But as the different specifick Gravi-

ties

ties of Water argue a different Mass and Texture; 'tis highly probable, that Heat of all boiling Waters is not the same; so that the Point is yet undetermin'd.

THERMOSCOPE; [of θερμη, *Heat*, and σκοπεω, *I view*.] An Instrument design'd to shew the Changes happening in the Air, with respect to *Heat* and *Cold*.

The Name of *Thermoscope* is indifferently used with that of *Thermometer*: However, there is some Difference in the literal Import of the Words; the first signifying an Instrument that shews or exhibits the Changes of Heat, &c. to the Eye; and the latter, an Instrument that measures those Changes: On which Foundation the *Thermometer* should be a more accurate *Thermoscope*.

This Difference the Excellent *Wolffius* taking hold of, describes all the *Thermometers* in use as *Thermoscopes*; shewing, that none of them do properly measure the Changes of Heat, &c. and that none of them do more than indicate the same.

Tho' their different Heights, Yesterday and To-day, shew a Difference of Heat; yet since they don't discover the *Ratio* of Yesterday's Heat to To-day's, they are not strictly *Thermometers*.

The *Acta erud. Lips.* proposes a Method of graduating the common *Thermometers* so, as that the unequal Divisions thereof shall correspond to equal Degrees of Heat; whereby the *Ratio* of To-day's Heat to Yesterday's will be measur'd, and consequently the *Thermoscope* improv'd into a *Thermometer*.

The Method is thus.

Take a slender Tube about four Palms long, with a Ball fasten'd to the same; pour into it Spirit of Wine, enough just to fill the Ball, when surrounded with Ice, and not a Drop over: In this State seal the Orifice of the Tube hermetically, and provide six Vessels, each capable of containing a Pound of Water, and somewhat over; and into the first pour eleven Ounces of warm Water, into the second ten Ounces, into the third nine, &c.

This done, immerse the *Thermometer* into the first Vessel, and pour into it one Ounce of hot Water, observing how high the Spirit rises in the Tube, and noting the Point with Unity; then remove the *Thermometer* into the second Vessel, into which are poured two Ounces of hot Water, and note the Place the Spirit rises to with two: By thus proceeding, 'till the whole Pound of Water is spent, the Instrument will be found to be divided into twelve Parts, denoting so many Terms or Degrees of Heat; so that at two, the Heat is double to that of one; at three, triple, &c.

But *Wolffius* shews, that tho' this Method is plausible, yet it is deceitful, and built on false Suppositions; for it takes for granted, we have one Degree of Heat by adding one Ounce of hot to eleven of cold Water, two Degrees by adding two Ounces to ten, &c. It supposes, that a single Degree of Heat acts on the Spirit in the Ball of a single Force, a double with a double Force, &c.

Lastly, it supposes, that if the Effect be produc'd in the *Thermometer* by the Heat of the ambient Air, which is here produc'd by the hot Water, the Air has the same Degree of Heat with the Water.

But none of these Suppositions are true: For as to the first; allowing the Heat of the hot Water equally distributed through the Cold, one Degree of Heat will be distributed through eleven Parts, two through ten, three through nine, &c. taking therefore equal Bulks of Water, *ex. gr.* a twelfth Part of each, the Heat will not be double in the one, triple in another, &c.

The first Supposition is therefore erroneous, and so is the second; for neither is the Heat of the hot Water equally diffus'd through the Cold; nor does the Heat of the hot Water act uniformly on the Spirit of Wine, *i. e.* not with the same Force all the Time of its Action.

For the third Supposition: The Heat of the ambient Air acts not only on the Spirit of Wine on the Ball, but only on that in the Tube, and therefore This as well as That will be chang'd.

Dr. *Hook*, in order to adjust the Gradations of a *Thermometer* with the greater Accuracy, hath contriv'd and describ'd an Instrument for that Purpose, in his *Micrographia*, page 38.

The Way of filling *Thermoscopes*, or such other small Glass Tubes with Spirit of Wine or Water.

Take the Ball of the Glass, and then warm it gently between your Hands; then seal it very well (tho' gently) before a good Fire, turning it round, that it may be equally warm; for without this Caution there will be Danger of its breaking: Then applying the Ball to the Flame of a Lamp or Candle, turning it about in it, heat it as hot as you can, without melting the Glass; and then speedily immersing the open End of the Pipe into the Vessel of that Liquor you intend to fill it withal, the Liquor will rise into it, and fill it near full.

The Reason of which Ascent of the Liquor is, that the Air within the Ball and the Tube being expell'd in great measure by the Heat, or at least rarefy'd there to a very great Degree; the immers'd open End of the Tube keeps off the Pressure of the circumambient Atmosphere on that Part of the Liquor that the End of the Tube covers: But the Atmosphere presses on all other Parts of the Liquor in the open Vessel, and consequently, there being none, or a very small Quantity of Air within the Tube to hinder it, forces it by its Weight up into the Tube, till it gain an Equilibrium with the Pressure or Weight of the Air without.

If the Tube cannot be fill'd full enough by this Method, the rest may be supply'd by a small Glass Funnel, the Shank of which must be drawn out exceeding slender, and inserted into the Orifice of the Tube; and then by blowing, you may force by your Breath the Spirit of Wine into the Tube, so as to fill it quite, or to what Degree you please.

Dr. *Hook*,

Dr. Hook, in his *Micrographia*, hath an Engine for graduating his *Thermometers*, to make them true Standards of Heat and Cold.

The *Thermometers* or *Thermoscopes* are Instruments of very great Use to Gardeners in the Management of Hot-beds or Stoves. They shew, by Inspection, the present Condition of the Air, and whether it be *hot* or *cold*; which Day in *Summer* is the *hottest*, and in the *Winter* which is the *coldest*, or any Part of the Day: And from thence many useful Experiments have, and may be made; *viz.* how much one *Spring* exceeds another in Coldness; which *Baths* are the *hottest* or *coldest*: And if being held in the Hand of a Person in a Fever, or otherwise apply'd, will nicely shew the Abatement or Increase of a Fever.

Mr. *Telende* makes use of a *Thermometer* that has a long Tube of about two Feet in length, and is about the eighth Part of an Inch diameter; and in this he has remark'd, that the Air is cold for his Plants when the Spirit rises to fifteen Inches; that it is temperate at sixteen Inches and a half; that the Air is warm when it rises to eighteen Inches: And this is the Standard for his *Pine-Apple* Heat. It is mark'd for *hot Air* at twenty Inches, and *sultry hot* at twenty one and a half: But in the common *English Thermometers*, these Degrees are differently mark'd; his *temperate Air* is about our *warm*; his *warm Air* our *hot*; and our *hot Air* is about the same as his *sultry*.

He has directed some *Thermometers*, &c. to be made for both Hot-beds and Stoves, by which a Person may at once be appriz'd of the Degree of Heat under the Line, and of the several Degrees distinctly mark'd for the natural Growth of Plants of every Climate, from the Equinoctial Line to the fifty-second Degree of Latitude.

These *Thermometers* are mark'd with the Names, and also the principal Places, with their Degrees of Latitude and Summer Heat, whether they lie *North* or *South* of the Equinoctial Line; and also the different Times of the *Spring* in several Countries.

By this Means every Gardener may know, when it is proper to apply his Heat in its full Force, and what Degree of Heat ought to be used for the Welfare of any Plant from any Part of the World.

Mr. *Patrick* has fix'd his *Thermometer* to a Scale of ninety Degrees, which are numbred from the Top downward, and also a moveable Index fitted to it.

The Design of this is to shew how the Heat or Cold is changed, from the Time it was last look'd upon, according to the different Degrees of Heat and Cold in all Latitudes; as by the Trial of two *Thermometers* that have been regulated abroad, the one by Dr. *Halley* in his late *Southern Voyage*, and the other by Captain *Johnson* in his Voyage to *Greenland*. The first has a Degree of Heat under the Equinoctial Line, and the other a Degree of Cold in eighty eight Degrees North Latitude.

These Instruments, the *Barometer*, *Hygrometer* and *Thermometer*, or *Thermoscope*, dif-

cover the Alterations of the Air as to *Wet* or *Dry*, especially if it be accompanied with an *Hygrometer*; and the *Thermometer* shews the Condition of the Air as to *Heat* or *Cold*.

The Method prescrib'd to be used in keeping the Accounts or Observations made on the Alterations of these Instruments, is that which was used by the Honourable *Samuel Molyneux* Esquire.

1. There must be a Book for the Remarks in all the twelve Months of the Year, which are to be made six times every Day. At these Times you must observe:

1. How the Quicksilver rises or falls in the *Barometer*.

2. What is the Alteration of the *Hygrometer*.

3. How the Spirits in the *Thermometer* rise or fall.

4. From what Point of the Compass the Wind blows; and also with what Strength, according to the nearest Guess that can be made.

5. Whether it rains, snows, hails, &c. and in what Quantity.

Every Leaf of the Book is to be divided into several Columns; the first for the Day of the Month and the Week, the second for the Number of Inches and Parts of an Inch in the Tube of the *Barometer* where the Quick-silver stands at the Time when the Observation is made.

The *second* is to be for marking the Degrees which the Index of the *Hygrometer* points to at the same time.

The *third* is for shewing the Number of Inches and Parts of an Inch where the Spirits stand in the *Thermometer* at the Time when the Observation is made.

The *fourth* is for marking from what Point the Winds blow, and their Strength.

The *fifth* is for noting the Quantity of Rain, &c. that falls, and what Disposition the Clouds and Air have.

Take, for Example, the following Account of the second of *June* 1721, which Table the Reader will find inserted in the following Page.

According to this Method, a Weather-Book may be kept of the Country a Person resides in, and by comparing the Motions of the Quicksilver and Spirit with the Weather, at such Times as the Observations are made, a little Practice will enable a Person to give a good Judgment before-hand what Weather will happen.

For the greater Accuracy, many have the Names of the principal *Exoticks* written upon their *Thermometers*, over-against the several Degrees which are found by Experience to be properest for them; and the most curious Gardeners about *London* have agreed to make use of *Thermometers* of this Sort: Which are made by Mr. *John Fowler* in *Sweetin's-Alley*, near the *Royal-Exchange*; which have the Names of the following Plants opposite to their respective most kindly Degrees of Heat.

Which,

The TABLE.

Friday, June 2. 1721.	Barometer Inch. Par.	Hygrometer, with its Division and Parts.	Thermom.	Wind.	Weather.
Morning at 9	29 98	240	30	East, brisk Gale	Cloudy
Noon.	29 98	260 20	28	East, brisk Gale, or ditto.	
Afternoon at 3	29 98	280 20	28	Ditto	Ditto
Afternoon at 6	29 98	300 20	27	Ditto	Ditto
Evening at 9	29 98	315 15	28	Ditto	Ditto
Midnight.	29 98	320 5	28	Ditto	Ditto

Which, says the Reverend Mr. Hales in his excellent Treatise of *Vegetable Staticks*, in my *Thermometers* answer nearly to the following Degrees of Heat above the freezing Point, viz. *Melon-Thistle* 31. *Ananas* 29. *Pimento* 26. *Euphorbium* 24. *Cereus* 21½. *Aloe* 19. *Indian Fig* 16½. *Ficoides* 14. *Oranges* 12. *Myrtles* 9.

Mr. Boyle, by placing a *Thermometer* in a Cave, which was cut strait into the Bottom of a Cliff, fronting the Sea, to the Depth of 130 Feet, found the Spirit stood both in *Winter* and *Summer* at a small Division above Temperate: The Cave had 80 Feet Depth of Earth above it.

I, says Mr. Hales, mark'd my six *Thermometers* numerically, 1, 2, 3, 4, 5, 6. The *Thermometer* Number 1. which was the shortest, I plac'd with a South Aspect in the open Air; the Ball of Number 2 I set two Inches under Ground; that of Number 3 four Inches, Number 4 eight Inches, Number 5 sixteen Inches, and Number 6 twenty-four Inches: And that the Heat of the Earth at those several Depths may the more accurately be known, it is proper to place near each *Thermometer* a Glass Tube, sealed at both Ends, of the same Length with the Stems of the several *Thermometers*, and with tinged Spirit of Wine in them to the same Height as in each corresponding *Thermometer*; the Scale of Degrees of each *Thermometer* being mark'd on a sliding Ruler, with an Index at the Back of it, pointing to the corresponding Tube.

When at any time an Observation is to be made, by moving the Index to point to the Top of the Spirit in that Tube, an accurate Allowance is hereby made for very different Degrees of Heat and Cold in the Stems of the *Thermometers* at all Depths; by which means the Scale of Degrees will shew truly the Degrees of Heat in the Balls of the *Thermometers*, and consequently the respective Heats of the Earth, at the several Depths where they are plac'd.

The Stems of these *Thermometers* which were above the Ground, were fenc'd from Weather and Injuries, by square wooden Tubes: The Ground they were plac'd in, was a brick Earth in the Middle of my Garden.

July the 30th, he began to keep a Register of their Rise and Fall: During the following Month of *August* he observ'd, that when the Spirit in the *Thermometer*, Number 1. (which was expos'd to the Sun) was about Noon risen to 48 Degrees; then the second *Thermometer* was 45, the fifth 33, and the sixth 31; the third and fourth at intermediate Degrees: The fifth and sixth *Thermometer* kept nearly the same Degree of Heat, both Night and Day, till towards the latter End of the Month; when, as the Days grew shorter and cooler, and the Nights longer and cooler, they then fell to 25 and 27 Degrees.

Now so considerable a Heat of the Sun at two Feet depth under the Earth's Surface, must needs have a strong Influence in raising the Moisture at that and greater Depths, whereby a very great and continual Reek must always be ascending during the warm *Summer* Season, by Night as well as by Day; for the Heat at two Feet deep is nearly the same Night and Day; the Impulse of the Sun Beams giving the Moisture of the Earth a brisk undulating Motion, which watery Particles, when separated and rarefy'd by Heat, do ascend in the Form of a Vapour; and the Vigour of the warm and confin'd Vapour (such as is that which is one, two, or three Feet deep in the Earth) must be very considerable, so as to penetrate the Roots with some Vigour; as we may reasonably suppose from the vast Force of confin'd Vapour in *Aolipiles*, in the Digester of Bones, and the Engine to raise Water by Fire.

If Plants were not in this manner supply'd with Moisture, it were impossible for them to subsist under the scorching Heats within the *Tropicks*, where they have no Rain for many Months together: For tho' the Dews are much

greater there than in these more Northern Climates; yet doubtless, where the Heat so much exceeds ours, the whole Quantity evaporated in a Day there, does as far exceed the Quantity that falls by Night in Dew, as the Quantity evaporated here in a Summer's Day, is found to exceed the Quantity of Dew which falls in the Night.

But the Dew which falls in a hot Summer Season, cannot possibly be of any Benefit to the Roots of Trees, because it is remanded back from the Earth by the following Day's Heat, before so small a Quantity of Moisture can have soaked to any considerable Depth.

The great Benefit therefore of Dew in hot Weather, must be by being plentifully imbib'd into Vegetables, thereby not only refreshing them for the present, but also furnishing them with a fresh Supply of Moisture towards the great Expences of the succeeding Day.

It is therefore probable, that the Roots of Trees and Plants are thus by means of the Sun's Warmth constantly irrigated with fresh Supplies of Moisture; which by the same means insinuates itself with some Vigour into the Roots: For if the Moisture of the Earth were not thus actuated, the Roots must then receive all their Nourishment merely by imbibing the next adjoining Moisture from the Earth; and consequently the Shell of the Earth, next the Surface of the Roots, would always be considerably drier, the nearer it is to the Root, which I have not observ'd to be so.

And by Experiment 18 and 19, the Roots would be very hard put to it to imbibe sufficient Moisture in dry Summer Weather, if it were not thus convey'd to them by the penetrating Warmth of the Sun: Whence, by the same genial Heat, in Conjunction with the Attraction of the Capillary Sap-Vessels, it is carry'd up thro' the Bodies and Branches of Vegetables, and thence passing into the Leaves, it is there most vigorously acted upon in those thin Plates, and put into an undulating Motion by the Sun's Warmth, whereby it is most plentifully thrown off, and perspired thro' their Surface; whence, as soon as it is disintangled, it mounts with great Rapidity in the free Air.

But when, towards the latter End of October, the Vigour of the Sun's Influence is so much abated, that the first Thermometer was fallen to three Degrees above the freezing Point; the second to 10 Degrees, the fifth to 14 Degrees, and the sixth to 16 Degrees; then the brisk Undulations of the Moisture of the Earth, and also of the ascending Sap much abating, the Leaves faded and fell off.

The greatest Degree of Cold, in the following Winter, was in the first twelve Days of November; during which time, the Spirit in the first Thermometer, was fallen four Degrees below the freezing Point, the deepest Thermometer ten Degrees: The Ice on Ponds was an Inch thick: The Sun's greatest Warmth, at the Winter Solstice, in a very serene, calm, frosty Day, was against a South Aspect of a

Wall 19 Degrees, and in a free open Air, but 11 Degrees above the freezing Point.

From the 10th of January to the 29th of March was a very dry Season; when the green Wheat was generally the finest that was ever remember'd: But from the 29th of March 1725, to the 29th of September following, it rained more or less almost every Day, except ten or twelve Days about the Beginning of July; and that whole Season continu'd so very cool, that the Spirit in the first Thermometer rose but to 24 Degrees, except now and then a short Interval of Sun-shine; the second only to 20 Degrees, the fifth and sixth to 24 and 23 Degrees, with very little Variation: So that during this whole Summer, these Parts of Roots which were two Feet under-ground, had three or four Degrees more Warmth than those which were but two Inches under-ground: And at a Medium, the general Degree of Heat through this whole Summer, both above and under-ground, was not greater than the Heat of the Middle of the preceding September.

THLASPI, [*Θάλασπι*, so call'd of *θάλασσα*, to compress or squeeze together, because the Husk of it is very much compressed.] Mithridate Mustard.

The Characters are;

The Flower consists of four Leaves, which are plac'd in form of a Cross; out of whose Cup rises the Pointal, which afterward becomes a smooth, roundish Fruit, having commonly a leafy Border, and slit on the upper Side, divided into two Cells by an intermediate Partition plac'd obliquely with respect to the Valves, and furnish'd with smooth, roundish Seeds. To these Marks must be added, the undivided Leaves which distinguish it from Cresses.

The Species are;

1. THLASPI; *arvense*, *filiquis latis*. C.B.P. Field Mithridate Mustard, with broad Pods.
2. THLASPI; *montanum*, *sempervirens*. C.B.P. Mountain ever-green Mithridate Mustard.
3. THLASPI; *Creticum quibusdam*, *flore rubente & albo*. J.B. Candy Mithridate Mustard, with a reddish and white Flower, commonly call'd Candy Tuft.
4. THLASPI; *umbellatum*, *arvense*, *amarum*. J.B. The bitter Field umbellated Mithridate Mustard.
5. THLASPI; *Rosa de Hierico dictum*. Mor. Hist. Mithridate Mustard, call'd The Rose of Jericho.

The first Sort is sometimes found wild in England, but not near London. This is the Sort which the College of Physicians have order'd the Seeds to be us'd in some of the grand Medicines of the Shops; tho' the Seeds of several other Plants are commonly substituted instead of it, because the Seeds of this Sort are not very common in London; but the Plants might be easily cultivated in such Plenty, as to furnish the Town with the right Sort, the Plant being extream hardy, and requires no other Culture but to sow the Seeds in February upon an open Spot of Ground; and when the Plants are come up, they must be constantly clear'd

clear'd from Weeds : In *June* they will flower, and the Seeds will ripen soon after ; when the Plants do always perish, being annual.

The other Sorts are commonly cultivated in Flower-Gardens, where formerly they were sown for *Summer* Edgings to Borders ; but as they are apt to grow too rank for that Purpose, so the better Way is to sow the Seeds in small Patches in the Middle of the Borders between the taller Flowers ; and when the Plants are come up, they should be thin'd, and kept clear from Weeds, which will cause them to flower much stronger than if they are drawn up weak.

These Plants do flower in *June* and *July*, and their Seeds do ripen soon after : But in order to have a Succession of these and other small annual Flowers, many Persons do sow them at two or three different Seasons, viz. in *March*, *April* and *May* ; by which Means they continue them until the Frost comes in *Autumn* ; but those Seeds which are sown late in the *Spring*, should be carefully water'd in dry Weather, otherwise they seldom grow.

The red and white Candy Tufts, do vary so as not to be kept separate ; the Seeds of the Red producing some white Flowers, and those of the White some with red ones ; but of late, the *bitter umbellated* Sort has been cultivated in Gardens, and the Seeds sold in the Shops, by the Name of *White Candy Tuft*, tho', in reality, it is a different Plant : However, as this Sort produces beautiful white Flowers, it should have a Place in the Borders of the Flower-Garden for the sake of Variety.

The Rose of *Jericho* is a Plant of no great Beauty or Use, so is seldom cultivated except in Botanick Gardens. This requires the same Culture as the former Sorts, and is also an annual Plant.

THLASPIDIUM ; is so call'd of *Tblaspi*, because it something resembles this Plant.] Bastard Mithridate Mustard.

The Characters are ;

The Flower consists of four Leaves, which are plac'd in Form of a Cross, out of whose Cup rises the Pointal, which afterwards becomes a double, smooth Fruit, compos'd of two Parts, that are separated by an intermediate Partition, each of which swells with a red Seed, which is generally flat and oblong.

The Species are ;

1. **THLASPIDIUM** ; *fruticosum, leucos folio, semperflorens*. *Tourn.* Shrubby *Tblaspidium*, with a Wall-flower Leaf, and always flowering, commonly call'd The Candy Tuft-tree.

2. **THLASPIDIUM** ; *fruticosum, leucos folio variegato, semperflorens*. *Tourn.* The strip'd Candy-Tuft-tree ; *vulgò*.

There are several other Species of this Plant which are preserv'd in curious Botanick Gardens, most of which are annual, and have little Beauty in their Flowers, therefore I shall not enumerate them in this Place, since they are rarely cultivated in Flower-Gardens.

The first of these Plants here mention'd is pretty common in the Gardens near *London*,

where it is preserv'd in Green-houses with other Exotick Plants for the Beauty of its Flowers, which are commonly continu'd throughout the whole Year, making a very beautiful Figure in the Green-house at such Seasons when few other Plants are in Flower.

This Plant may be propagated by planting either Cuttings or Slips during any of the *Summer* Months, in Pots fill'd with fresh, light Earth, and plac'd under a Frame, observing to water and shade them until they have taken Root, after which they may be expos'd to the open Air, and when they have gotten strong Roots, they may be each transplanted into a separate Pot fill'd with light, fresh Earth, and may be plac'd amongst other hardy Exotick Plants in the open Air in *Summer* ; but in *Winter* they must be screen'd from severe Frost, tho' in mild Weather they should have as much free Air as possible.

But altho' these Plants are generally preserv'd in Pots, and plac'd in a Green-house in *Winter*, yet after they have acquir'd Strength, they may be planted in warm, dry Borders ; where, if the Soil be fresh, and not too rich, they will endure the Cold of our ordinary *Winters* very well without any Covering : And the Plants thus treated will flower much better than those kept in Pots.

The strip'd Sort is propagated as the plain, and must be treated in the same manner, but being somewhat tenderer, must be constantly shelter'd in *Winter*, otherwise it will be destroy'd in a small Frost.

THISTLE ; *vide Carduus*.

THORN-APPLE ; *vide Stramonium*.

THORN, the *Glaftenbury* ; *vide Mespilus*.

THUNDER is defin'd by some to be a Noise in the lowest Region of the Air, excited by a sudden kindling of sulphureous Exhalations.

Some also account for it, by supposing two Clouds impending over one another ; the upper and rarer whereof becoming condens'd by a fresh Accession of the Air, rais'd thither by Warmth from the lower Parts of the Atmosphere, or driven upon it by the Wind, immediately falls forcibly down upon the lower and denser Cloud ; by which Fall the Air interpos'd between the two being compress'd, that next the Extremities of the two Clouds is squeez'd out, and leaves Room for the Extremity of the upper Cloud to close tight upon the under ; thus a great Quantity of Air is inclos'd, which escaping through some winding irregular Vent or Passage, it occasions the Noise we call *Thunder*.

But this only reaches to the *Phænomena* of *Thunder* heard without *Lightning* ; and, in effect, we have now a better Solution : That *Thunder* is not occasion'd by the falling of the Clouds, but by the kindling of sulphureous Exhalations in the same manner as the Noise of *Aurum Fulminans*.

Sir

Sir *Isaac Newton* says, There are sulphureous Exhalations always ascending into the Air, when the Earth is dry; there they ferment with the nitrous Acids, and sometimes taking Fire, generate into *Thunder*, *Lightnings*, &c.

That besides the Vapours rais'd from Water, &c. there are also Exhalations carry'd off from *Sulphur*, *Bitumen*, *volatile Salts*, &c. is past all Doubt: The vast Quantity of sulphureous and bituminous Matter all over the Surface of the Earth, and the volatile Salts of Plants and Animals afford such an ample Stock thereof, that it is no Wonder the Air should be fill'd with such Particles, rais'd higher or lower, according to their greater or less Degree of Subtily and Activity, and more copiously spread in this or that Quarter, according to the Direction of the Winds, &c.

The Atmosphere about the Earth abounds with nitrous Particles of a spirituous Nature, which are every where carry'd along with it; besides which Sort of Particles, there are others rais'd up into the Air, which may be somewhat of the Nature of sulphureous, nitrous, and other combustible Bodies: As we see Spirit of Wine, Spirit of Turpentine, Camphire, and almost all other combustible Bodies will by Heat be rarefy'd into the Form of Air or Smoak, and be rais'd up into the Air.

All which, if they have a sufficient Degree of Heat, will catch Fire, or be turn'd into Flame by the nitrous Parts of the Air, as thousands of Experiments might be brought to prove.

There are also other Sorts of these sulphureous Steams which arise from the subterraneous and mineral Bodies, which only by their coming to mix with the Nitre of the Air, tho' they have no sensible Heat in them, will so ferment and act one upon another as to produce an actual Flame, which is a thing that has often been found in Mines, and more especially if any Part of them be kindled; then the whole Train, which is mingled with the contiguous Air, will immediately take Fire like a Train of Gunpowder, and then run from one End of those Vapours to the other, be they ever so long; as I could prove by a multitude of Relations from Coal Mines, and several other Mines.

The Ascension of which Vapours is so sudden, and with such Violence and Swiftneſs runs from one End to the other, as often to kill the Miners, blow up their Props, Turns, Stays, Houses, &c. and produces as prodigious Effects, as if a vast Quantity of Gunpowder had been fired in the Mine.

Now *Lightning* in the Air seems to be much of the same Nature; for the Air is continually furnish'd with spirituous, nitrous Parts, and the Summer Heat, whenever extraordinary, raises up out of the Earth (and to this the subterranean Heat also is continually concurring), a great Quantity of sulphureous Vapours, which are of such a Nature, as that meeting with the Nitre of the Air, they work upon each other, and thereby begin a farther Degree of Heat, which gradually increases,

till at last it arrives at a certain Pitch, and then they fall upon, and work upon one another, producing an actual Fire and Flame, which with wonderful Swiftneſs fires the whole Train, and so produces a Flash and Noise. Thus Dr. *Hook*.

Dr. *Wallis*, in *Philos. Transact.* N^o. 231. says, That *Thunder* and *Lightning* are so very like the Effects of fir'd Gunpowder, that we may reasonably judge they proceed from the like Causes.

Now the principal Ingredients in Gunpowder are Nitre and Sulphur, (the Admission of Charcoal being chiefly to keep their Parts separate for the better kindling of it) so that if we suppose in the Air a convenient Mixture of nitrous and sulphureous Vapours, and those by Accident to take Fire, such Explosion may well follow with Noise and Light, as in the firing of Gunpowder; and being once kindled, it will run from Place to Place, as the Vapour leads it, like as in a Train of Gunpowder, with the like Effects.

This Explosion, if high in the Air, and far from us, will do no Mischief, or not considerable, like a Parcel of Gunpowder fired in the open Air, where nothing is near enough to be hurt by it: But if the Explosion be near to us, or amongst us, it may kill Men or Cattle, tear Trees, fire Gunpowder, break Houses, or the like, which Gunpowder would do in like Circumstances.

This Nearness or Farness may be estimated by the Distance of the Time between seeing the Flash of *Lightning*, and hearing the Clap of *Thunder*; for tho' in their Generation they be simultaneous, yet Light moving faster than Sound, they come to us successively.

I have observ'd, that commonly the Noise is about seven or eight Seconds after the Flash; but sometimes 'tis much sooner in a Second or two; or less than that just after the Flash; and then the Explosion must needs be very near us, and even amongst us: And, in such Cases, I have more than once prefaged the Expectation of Mischief, and it hath prov'd accordingly.

Now that there is in *Lightning* a sulphureous Vapour, is manifest from the sulphureous Smell that attends it, and the sultry Heat in the Air, which is commonly a Fore-runner of *Lightning*.

And that there is a nitrous Vapour in it, we may reasonably judge, because we do not know of any Body so liable to a sudden and violent Explosion.

As to the kindling of those Materials, in order to such an Explosion, I am told, that a Mixture of Sulphur and Filings of Steel, with the Admission of a little Water, will not only produce a great Effervescence, but will of itself break forth into an actual Fire: I say, a little Water, because too much will hinder the Operation, or quench the Fire.

And this I take to be the Cause of the *Bath-Waters*, and other hot Springs, where Steel and Sulphur cause a great Effervescence, but no Flame; so that there wants only some *Chalybeate* or *vitriolick Vapour* (or somewhat equivalent)

equivalent) to produce the whole Effect, (there being no Want of aqueous Matter in the Clouds), and there is no doubt, but that amongst the various *Effluvia* from the Earth, there may be copious Supplies of Matter for such Mixtures.

The same Account may be also given of *Aetna*, and other burning Mountains, where the Mixture of Iron and Sulphur may give a Flame, which is often attended with prodigious Explosions and Earthquakes, from great Quantities of Nitre, as in springing a Mine.

M. Le Clerc defines *Thunder* to be a rumbling Noise in the highest Region of the Air, occasioned by the sudden Inflammation of Exhalations.

This he explains and accounts for to the Purposes following:

Besides those Vapours that are rais'd by the Heat of the Sun, out of the Water and moist Places, there are also a world of Particles; which are carry'd off from Sulphur, Bitumen, volatile Salts, and other Bodies of the like Nature; these Particles fly about in the Air, either higher or lower, according to the various Degrees of their Levity and Gravity; and these are those which are by Naturalists commonly call'd Exhalations.

Since it is evident, that there is a vast Quantity of sulphureous and bituminous Matter all over the Surface of the Earth; and also that both Plants and Animals abound with volatile Salts, there is no Cause that we should wonder why the Air is fill'd with such Particles by the Heat of the Sun.

Nor is it possible but that they should be driven about all over the Air; but it is not to be doubted, but that they arise in greatest Plenty from dry, sun-burnt Places, and hang thereabout; and hence it is easy to account for all those Meteors, which are inflamed in the Air.

In all aerial Fires there are three Things observable.

1. That they are lighted without any human Means, and by some invisible Way.
2. That they run about the Air in various Figures.
3. That some of them continues longer than others do; but yet they all vanish in a short time.

In order to make a Flame or Spark appear, there is nothing more necessary, than that there should be some Particle so whirl'd about in the Air, as to cast aside all the grosser Matter, and play about in the most subtil Part of the Air.

Now, there are some Matters which are apter to be put in Motion than others; such as the Parts of Sulphur, Bitumen, Nitre, &c.

Therefore, when a sufficient Quantity of Matter of these Kinds are gotten together, it is no difficult Matter for one or two of those Particles to be whirl'd about by the Heat of the Air; and when they are once inflamed, to set Fire to all the rest that are about them; as a Consequence of which it is observable, that these aerial Fires are common in *Summer*, but more rare in *Winter*; and by how much the

Summer is hotter, the more common such Fires are: And this sufficiently shews, that the Matter of such Fires is rais'd and inflamed by the Heat of the Air and the Impetuosity of its Motion.

This may be demonstrated by an Experiment made by the Preparation which Chymists call *Aurum fulminans*. Gold being dissolved in *Aqua Regia*, and precipitated with Oil of Tartar, the Dust which sinks to the Bottom, after it has been dry'd gradually, and without Fire, will afterwards be fired by a moderate Heat, and will go off with a Noise like that of a Musket discharg'd.

This Experiment may also be made at a less Expence, and also as effectually, by mixing three Drams of Salt-petre with one Dram of Brimstone, and a Dram and a half of Tartar, and beating them to a very fine Powder; this being done, the Powder will take Fire as readily as the *Aurum fulminans*, but will not give quite so great a Crack.

Now if it be consider'd, that the Particles of Nitre, Sulphur, and Tartar, which fly in Air, are much finer than those of the Composition before-mentioned: It is easy to imagine, that they may be fired by a moderate Heat aloft in the Air, if they be mixed according to the aforesaid Proportion.

This Sort of Matter must be carried about the Air in various Figures, according as the Winds blow, and as it is greater or lesser in Quantity, and according as it takes Fire.

If the Fire begins at one End, and burns gradually, it is called a *Lamp*; but if a long Exhalation takes Fire at once, it is called a *Dart*: Sometimes these Exhalations are hurried one way or other by the Stream of the Air, while they are in Flame, sometimes they continue in the same Place, and then they are called *Beams*; at other Times the Clouds part, and the Sky seems to retire, which may be caus'd by the Wind, and a Flame will flash out at this Opening; when this happens it is call'd a *Chasm*.

When burning Exhalations have less Sulphur in them (which yields a paler Flame) than Nitre, Bitumen, or Tartar, they appear as red as Blood.

Though this Sort of Inflammation may appear either by Night or Day, yet they will be more plain to be seen in the Night, in the Absence of the Sun, the prevalent Light of which obscures the Sight.

Those which are commonly call'd *Shooting Stars*, are but small Exhalations in our Air, and therefore are not properly *Stars*.

Ignis Fatui, [*Jack-in-a-Lanthorn*, *Will-in-a-Whisp*, &c.] seem to consist of a more greasy Exhalation. It is evident, that oily Substances, though they are easily lighted, yet they are not spent so soon as those of Sulphur and Nitre.

Hence it may be learn'd, that all such inflamed Exhalations must necessarily disappear soon, because the subtil Matter of which they consist is soon spent. But as the Matter of them is not all alike, so their Continuance is not exactly the same: We may observe that

a Flame, which is raised out of various Materials, will either last longer, or be extinguish'd sooner, according as they are compos'd.

Oil mix'd with Bitumen or Sulphur will flame longer than if mix'd with Nitre.

From what has been said, it will be no difficult Matter to conceive how *Thunder* is produc'd: For the Experiment shews, that Flame which throws off the Air with great Violence, sometimes occasions a great Crack. And it being an easy Matter for heterogeneous Particles to mix in great Quantities in the upper Region of the Air, and to be set on Fire by a moderate Heat; there is no need to have Recourse to any thing else to explain the Cause of *Thunder*.

As for the Noise of *Thunder*, we may be satisfied by all Experiments, that it cannot be any otherwise produc'd, than by a swift and vehement Explosion of the Air, which is forc'd every Way; and the Motion of it being continued to our Ears, strikes the *Tympana* [Drums] of them, and this causes the Sensation we call Sound.

As to the Noise of *Thunder*, it is observable, that it sounds as if it passed through Arches, and was broken variously. The Reason of it is, because the Flame is kindled among the Clouds, that hang over one another, and the agitated Air flies between them. Thus it may be observed, that when a Gun is discharged at a good Distance, the Inequalities of the Ground, do cause it to sound to us with several repeated broken Reports.

It is also plain, that the Flame is the Cause of *Thunder*, because most commonly the Flash is seen before the Crack is heard. There is not such a Distance indeed between the Firing of the Exhalation and the Concussion of the Air, as there is between the seeing of the Flash and the hearing of the *Thunder*. But the Reason of it is, that we see any thing, as it were, in an Instant: but Sounds are convey'd to our Ears by a successive Motion of the Air, and therefore more Time is requir'd to hear than to see.

By what has been said before it appears, that *Lightning* is an inflamed Exhalation, compos'd of Sulphur and Nitre, or some such Matter, or a Mixture of several Sorts together. The Inflammation is sometimes with a Noise, as in cloudy Weather, and sometimes without, as in clear; which causes some Variety in it.

Sometimes it lightens without Noise, which is when the Exhalation consists of Matter softer than ordinary, which is not so soon kindled. If it consists only of sulphureous Particles, which are a softer Sort, they are not so apt to fire all at once, nor give the Air such a Concussion, as shall cause us to hear the Noise of it: But if there be many Particles of Nitre and Tartar mingled with the Sulphur, the former being harder, cause the whole Exhalation to burst at once with such Impetuosity as to rend the Air, and to make a vast Noise.

The Noise of *Thunder* is more diversify'd in cloudy Weather, because the Air is vari-

ously reverberated from the Clouds to us; but if there are no Clouds, the Air flows through the open Spaces to our Ears, more freely and evenly; and it frequently *lightens* in such Weather without *Thunder*, because the Inflammation consists only of sulphureous Particles; and, on the contrary, it often *thunders* in cloudy Weather without any *Lightning* appearing visibly, because it is intercepted by the Clouds.

Rain generally attends *Thunder* and *Lightning*, either at the same Time or soon after; and it frequently rains faster after a Clap of *Thunder*: So that Rain seems to be the Effect of *Thunder*.

As for *Thunderbolts*: When it *thunders* and *lightens* there sometimes falls a *Thunderbolt*. This *Thunderbolt* is a most rapid Flame, that darts out of the Clouds to the Ground, and strikes through every thing that is in its Way: And it is observ'd to have the following peculiar Phenomena.

1. That it oftner strikes upon high Places than low; as upon Mountains, Towers, Steeples, Trees, &c.
2. That it sometimes burns Peoples Cloaths, without hurting their Bodies.
3. That it sometimes breaks their Bones, and at the same time does not hurt their Flesh or their Garments.
4. That it has melted or broken a Sword in a Scabbard, without hurting the Scabbard; and on the contrary, has sometimes burnt the Scabbard all over, and at the same time done no Harm to the Sword.

From these Considerations we may conclude, that a *Thunderbolt* is an Exhalation, which is kindled of a sudden, and is copious enough to be hurried down to us by Winds.

Thunderbolts are most commonly darted aslope, through the Air; and this may be occasioned by the Winds, which seldom or never blow downright. And it is probable that the Flame is beaten down by the Wind, and reaches the Ground before the Matter of it is quite spent.

And this may be the Reason, that for the most part they strike upon high Places; for as they fall obliquely thro' the Air, they often in their Way meet with Mountains, Towers, &c. and the Reason that the Force of their Flame is very different, is probably from the Difference of the Exhalations which form the *Thunderbolt*, the Bodies from which they are collected being sulphureous, bituminous, or saline; and from thence it may be, that it sometimes burns Garments at the same Time that it passes over the Bodies without doing them any Harm.

Sometimes it penetrates the soft Flesh harmlessly, as to that, and yet breaks the hard Bones; as Gold and other Metals are dissolv'd by *Aqua Regia* and *Aqua Fortis*, and in the mean time the Paper shall not be hurt by them. And for the same Reason it is, that a Sword may be melted in a Scabbard, and yet the Scabbard remain entire; and so it would be if they were both laid together in *Aqua Fortis*: Because the acute Parts of the *Aqua Fortis*

Fortis do not operate upon soft Matter, the Particles of which are branched, as they do upon harder Bodies, into the Pores of which they insinuate themselves, and dissolve the Contexture.

Again; *Thunderbolts* are more common in *Summer* and *Autumn* than they are in *Winter* and the *Spring*; for which, three Reasons may be given.

1. That the Cold is so great in the upper Region of the Air in *Winter* and *Spring*, that it will not permit the Exhalations to take Fire.

2. That the Exhalations are fewer in those Seasons, because they are kept from ascending by the Cold; for they cannot rise in any Quantity without a considerable Heat.

The Air is so fill'd with Vapours and Clouds in the *Winter* and *Spring*, that all Exhalations are dilated, and therefore are not capable of being inflamed.

Also some Places are more obnoxious to *Thunderbolts* than others, and they are such as send forth Plenty of Exhalations for that Purpose, and where they are not easily dispers'd by the Winds; and thence in hotter Countries, where the Sun exhales out of the Earth all that can be exhaled, *Thunderbolts* are more frequent than they are in Climates that are colder: So that in those Places that are encompass'd with high Mountains, where the Wind has not Accels to blow so freely, the Exhalations are kept together, and *Thunderbolts* are more common; but in spacious Plains, which are, as it were, swept by the Winds, these Exhalations are scatter'd and blown about.

THURIFEROUS, signifies bearing or producing Frankincense.

THUYA, [so call'd of *Θύα*, to perfume with Smoak; because this Plant hath a penetrating Smell.] The Arbor Vitæ, *vulgô*.

The Characters are;

The Leaves are ever-green, squamous, and compress'd, having small, oblong, squamous Cones growing upon the Backsides, in which the Seeds are contained.

The Species are;

1. **THUYA**; *Theophrasti*. C. B. P. The Arbor Vitæ, or Tree of Life.

2. **THUYA**; *Theophrasti*, *folio variegato*. The strip'd Arbor Vitæ, or Tree of Life.

The first Sort was formerly in greater Esteem than at present in the *English* Gardens; it is commonly rais'd in the Nurseries near *London*, where their Heads are sheered into a conical Figure; but since that low Taste of Gardening, in crowding vast Quantities of clipp'd Plants into Gardens, is justly exploded, these Trees do not meet with so good Reception as formerly: But notwithstanding this, there may be some of them planted in Gardens to great Advantage, if they are placed in Wildernesses, or Clumps of ever-green Trees, where these should be planted with other Sorts which are nearly of the same Growth; and in such Plantations the

dull, heavy, green Colour of these Leaves, will be very useful in adding to the Lustre of those which are of a more lively Green, and make a fine Variety.

The strip'd Sort is preserved by some who are curious in collecting such Varieties, but there is little Beauty in it.

These Trees may be propagated by laying down their tender Branches in the *Spring* of the Year, observing to slit 'em at a Joint (as is commonly practis'd for Carnations) as also to water 'em in dry Weather, and keep 'em constantly clear from Weeds: If these Things be duly observed, the Layers will be rooted by the *Spring* following, at which Time they may be taken off, and transplanted into a Nursery in Rows three Feet asunder, and the Plants eighteen Inches Distance in the Rows; observing to lay a little Mulch upon the Surface of the Ground about their Roots, to prevent the Wind from drying it, and in dry Weather they should be often refresh'd with Water, until they have taken Root, after which they must be constantly kept clear from Weeds, and the Ground dug every *Spring* between the Rows, that their Roots may extend themselves on every Side. In this Nursery they may remain five or six Years, and may then be transplanted where they are to remain for good. The best Season to remove these Trees is about the Beginning of *April*, just before they shoot.

These Trees may also be propagated by Slips, which should be planted on a moist Soil in *April*, and if shaded in very hot, dry Weather, most of 'em will take Root, after which they must be treated as hath been directed for the Layers.

The Leaves of this Tree being bruised between the Fingers, emit a strong Scent, somewhat like Ointment; and I have been inform'd, that some Persons do make an Ointment thereof, which is esteem'd excellent for fresh Wounds. The Wood of this Tree is greatly esteem'd by the Turners, for making Bowls, Boxes, &c. But as the Tree is slow of Growth, and seldom arrives to any great Magnitude in this Country, (rarely growing above twenty Feet high), so it is not worth cultivating for its Timber.

THYMELÆA, [this Plant is so call'd of *Θύμιν*, Thyme, and *ἐλαια*, an Olive-tree, because its Leaves are narrow as the Thyme, and thick as those of the Olive-tree.] Spurge Laurel, or Mesereon.

The Characters are;

The Flower consists of one Leaf, is for the most part Funnel-shap'd, and cut into four Segments, from whose Center rises the Pointal, which afterwards becomes an oval Fruit which is in some full of Juice, but in others is dry, in each of which is contained one oblong Seed.

The Species are;

1. **THYMELÆA**; *Laurifolia, sempervirens*, *sem Laureola Mas. Tourn.* The Spurge, or Dwarf Laurel.

2. **THYMELÆA**; *Laurifolia, sempervirens, foliis variegatis*. The strip'd Spurge Laurel.

2. **THYMELÆA**;

3. THYMELÆA; *laurifolio deciduo, fructu Laureola fœmina. Tourn.* The common Mesereon.

4. THYMELÆA; *laurifolio deciduo, flore al-bido, fructu flavescente. Tourn.* The Mesereon with white Flowers and yellowish Fruit.

5. THYMELÆA; *laurifolio deciduo, flore rubro.* The Mesereon with red Flowers.

6. THYMELÆA; *laurifolio deciduo, foliis ex luteo variegatis.* The common Mesereon with strip'd Leaves.

The first of these Plants is found wild in Woods and other shady Places in divers Parts of England, but is often cultivated in Gardens for Variety; where, if it is planted in Wilderesses or shady Walks, it will thrive very well; and being an Ever-green, and producing its Flowers in Winter, when few other Plants do flower, makes it the more acceptable. The second Sort is a Variety of the first, which is preserved for the Beauty of its strip'd Leaves.

Both these Plants may be propagated by Suckers taken from the old Plants, or by Layers, which should be taken off in Autumn, and planted in a strong Soil and shady Situation, where, after they have taken Root, they will require little farther Care.

The several Sorts of Mesereon are propagated by sowing their Seeds, the best Season for which is in August, soon after they are ripe, when they begin to fall from the Trees: These should be sown upon an East Border, where they may have only the Morning Sun, and covered about half an Inch with fresh Earth; in the Spring the Plants will appear, when they must be carefully clear'd from Weeds, and in dry Weather should be often watered, which will greatly promote their Growth. In this Border they may remain two Years, by which Time they will be strong enough to transplant; when there should be a Spot of strong fresh Earth prepared for them, into which they should be planted in Autumn, in Rows three Feet distance, and the Plants eighteen Inches asunder in the Rows, treating 'em afterwards in the usual Manner with other Kinds of Shrubs, while in this Nursery; and when they are large enough to plant out for good, they may be taken up in Autumn, with a Ball of Earth to the Root of each Plant, and placed where they are to remain, which should be in a strong, moist Soil, and a shady Situation, where they will thrive and flower extremely well.

These Plants are great Ornaments to a Garden early in the Spring, before other Things are in flower, for if the Season is mild they often flower in January, but in February they are always in Perfection. They seldom grow to be more than five or six Feet high in England, so should be planted among other Shrubs of the same Growth.

The Sort with strip'd Leaves may be propagated by budding or inarching it upon the plain Sort, because the Seeds will not produce strip'd Plants.

THYMUS, [so call'd of its Odour,

because it is a Plant very odorous; or of *Spirits*; animal Spirit, because it is good in reviving the animal Spirits.] Thyme.

The Characters are;

It hath a labiated Flower, consisting of one Leaf, whose Upper-lip is erect, and generally split in two, and the Under-lip is divided into three Parts; out of the Flower-cup arises the Pointal, accompany'd by four Embryo's, which afterwards become so many Seeds, inclos'd in a Husk, which was before the Flower-cup. To these Marks must be added, Hard ligneous Stalks, and the Flowers gather'd into Heads.

The Species are;

1. THYMUS; *vulgaris, folio latiore. C. B. P.* Common broad-leav'd Thyme.

2. THYMUS; *vulgaris, folio tenuiore. C. B. P.* Common narrow-leav'd Thyme.

3. THYMUS; *vulgaris, folio latiore variegato.* Broad-leav'd strip'd Thyme.

4. THYMUS; *capitatus, qui Dioscoridis. C. B. P.* The true Thyme of the Antients.

There are several other Species of Thyme, which are preserved in Botanick Gardens for Variety; but as they are seldom cultivated for Use, so I shall not enumerate them in this Place. The Sort with broad Leaves is the most common in England; this is cultivated in the Kitchen-Gardens as a Soap Herb, and also for medicinal Use. The next two Sorts are preserved in many Gardens for Variety, being equally as good as the first for Use: But the fourth Sort is less common in England than either of the former.

These Plants may be propagated either by Seeds or parting their Roots; the Season for either is in March. If it is done by sowing the Seeds, it should be done upon a Bed of light Earth, observing not to bury the Seeds too deep, which will cause 'em to rot: When the Plants are come up they should be carefully clear'd from Weeds, and if the Spring should prove dry, if they are watered twice a Week it will greatly promote their Growth; and in June the Plants should be thinned, leaving 'em about six Inches asunder each Way, that they may have Room to spread, and those Plants which are drawn out may be transplanted into fresh Beds at the same Distance, observing to water them until they have taken Root, after which they will require no farther Care, but to keep 'em clear from Weeds, and in the Winter following they may be drawn up for Use.

But if these Plants are propagated by parting their Roots, the old Plants should be taken up about the latter End of March, and split into as many Parts as can be taken off with Root; these should be transplanted into Beds of fresh light Earth, at six or eight Inches distance, observing if the Season is dry to water them until they have taken Root, after which they must be duly weeded, and they will thrive, and soon be fit for Use.

In order to save Seeds of these Plants, some of the old Roots should remain unremoved in the Place where they were sown the preceding

ing Year; these will flower in *June*, and in *July* the Seed will ripen, which must be taken as soon as it is ripe, and beat out, otherwise the first Rain will wash it all out of the Husks.

These Plants do root greatly in the Ground, and thereby draw out the Goodness of a Soil sooner than most other Plants; so that whatever is sown or planted upon a Spot of Ground whereon *Thyme* grew the preceding Year, will seldom thrive, unless the Ground be trench'd deeper than the *Thyme* rooted.

THYME THE LEMON; *vide Serpillum*.

THYME THE MARUM; *vide Marum*.

THYME THE MASTICK; *vide Mastichina*.

TILIA, [of *τιλον*, a *Feather*, because this Tree bears a Flower in its Stalk, which somewhat resembles the Plum of a Colewort; or of *Telum*, a *Dart*, because its Wood is used in making Darts.] The Lime, or Linden-Tree.

The Characters are;

The Flower consists of several Leaves, which are placed orbicularly, and do expand in Form of a Rose, having a long, narrow Leaf, growing to the Foot-stalk of each Cluster of Flowers, from whose Cup rises the Pointal, which afterwards becomes a testiculated Fruit, consisting of one Capsule, containing an oblong Seed in each.

The Species are;

1. TILIA; *famine, folio majore*. C. B. P. The common or broad-leav'd Lime-tree.

2. TILIA; *famina, folio minore*. C. B. P. The small-leav'd Lime-tree.

3. TILIA; *foliis molliter hirsutis, viminibus rubris, fructu tetragono*. Raii Syn. The red-twigg'd Lime-tree.

4. TILIA; *Caroliniana, folio longius mucronato*. The Carolina Lime-tree.

5. TILIA; *famina, folio majore variegato*. The strip'd-leav'd Lime-tree.

The three first-mention'd Trees are very common in *England*, being cultivated in most Nurseries, but the *Carolina* Sort is not at present very common; this was sent from *Carolina* by Mr. Mark Catesby, in the Year 1726. but as yet there does not appear any considerable Difference from the common Sort. That with strip'd Leaves is preserved by some for the Sake of Variety, but there is no great Beauty in it.

All these Trees are easily propagated by Layers, which in one Year will take good Root, and may then be taken off and planted in a Nursery, at four Feet distance Row from Row, and two Feet asunder in the Rows; the best Time to lay 'em down and to remove 'em is at *Michaelmas*, when their Leaves begin to fall, that they may take Root before the Frost comes on, tho' they may be transplanted any time from *September* to *March* in open Weather; but if the Soil is dry, it is much the better Way to remove 'em in *Autumn*, because it will save a great Expence in

watering them, if the *Spring* should also prove dry. In this Nursery they may remain four or five Years, during which Time the Ground should be dug every *Spring*, and constantly kept clear from Weeds; and the large Side-shoots pruned off, to cause 'em to advance in Height; but the small Twigs must not be pruned off from the Stems, because these are absolutely necessary to detain the Sap, for the Augmentation of their Trunks, which are apt to shoot up too slender, when they are entirely divested of all their lateral Twigs. If the Soil in which they are planted be a fat Loam, they will make a prodigious Progress in their Growth, so that in five Years time they will be fit to transplant out where they are to remain.

These Trees were a few Years since greatly esteem'd for planting Walks and Avenues near Habitations, because in a few Years they would afford a pleasant Shade, and might be removed, when grown to a large Stature, without Hazard, so that a Person might enjoy the Pleasure of 'em in a short time: But of late they are much less valued, on account of their Leaves decaying early in *Autumn* (especially if the Soil be dry in which they are planted), so that many times they are almost destitute of Leaves by the Beginning of *September*, whereas the *Elm* continues in Beauty a full Month longer, and the Wood of the latter being much preferable to that of the former, has introduced these Trees instead of *Limes* in most of the modern Plantations.

The Timber of the *Lime-tree* is used by the Carvers, it being a soft, light Wood; as also by Architects for framing the Models of their Buildings; the Turners do also use it for making light Bowls, Dishes, &c. but it is too soft for any strong Purposes.

These Trees will continue sound a great Number of Years, and if planted in a good loamy Soil, will grow to a considerable Bulk: I have measur'd one of these Trees which was near ten Yards in Girt two Feet above the Ground, and was then in a very thriving Condition; and Sir Thomas Brown mentions one of these Trees which grew in *Norfolk*, that was sixteen Yards in Circuit a Foot and half above-ground, in Height thirty Yards, and in the least Part of the Trunk it was eight Yards and an half.

TINUS: *Laurus Tinus, vulgô*.

The Characters are;

The Flowers grow in Clusters, and consist of one Leaf, which is divided into five Parts toward the Top-part; these are succeeded by small Fruit, shap'd somewhat like an Olive, but are umbilicated, each containing one Pear-shap'd Seed.

The Species are;

1. TINUS; *prior*. Clus. Hist. The Bastard shining-leav'd *Laurus Tinus, vulgô*.

2. TINUS; II. Clus. Hist. The rough-leav'd *Laurus Tinus, vulgô*.

3. TINUS; III. Clus. Hist. The small-leav'd *Laurus Tinus, vulgô*.

4. *TINUS*; prior *Clusii*, folio atroviridi splendente. The shining-leav'd *Laurus Tinus*, vulgō.

5. *TINUS*; prior *Clusii*, foliis ex albo variegatis. The strip'd shining leav'd *Laurus Tinus*.

6. *TINUS*; II. *Clusii*, foliis ex luteo variegatis. The strip'd rough-leav'd *Laurus Tinus*.

These Plants are greatly propagated in the Gardens near *London* for their Beauty, the Leaves always remaining green, and their Flowers are produced in great Plenty in the *Winter* Season, when few other Shrubs do flower.

These Plants were a few Years since preserved in Pots and Tubs, and placed in the Green-house in *Winter*, with *Oranges*, *Myrtles*, and other exotick Trees; but of late Years they have been planted in the open Ground, where they resist the Cold of our ordinary *Winters* very well, and are rarely injured, except in very severe Frosts, and then they are seldom destroy'd, though their Heads may be kill'd (as was the Case with many of these Trees in the Year 1728.) yet those which were left undisturb'd, shot out fresh again the following *Summer*, and have since made good Plants; which should caution People from rooting out Plants too soon, when they may seem to be kill'd by Frost.

These Plants may be propagated by laying down their tender Shoots in the *Spring*, which if kept clear from Weeds, and duly water'd in dry Weather, will take Root by the succeeding *Spring*, when they should be taken off and transplanted into a mellow, loamy Soil, (but not too wet) at three Feet distance Row from Row, and eighteen Inches asunder in the Rows, observing to lay some Mulch upon the Surface of the Ground about their Roots, and in dry Weather to refresh 'em with Water until they have taken Root.

There should be also some strait Stakes fix'd down by the Side of each Plant, to which they should be fasten'd, in order to render their Stems strait, otherwise they will be crooked and unsightly. But it is not proper to have these Plants more than two Feet high in clear Stems, because when their Heads are advanced above Sight, the Beauty of the Plants are lost, and they are in greater Danger of being destroy'd in bad Weather: Therefore, when their Stems are two Feet high, their upright Shoots should be stopp'd, in order to force out lateral Branches, which may be so prun'd in the growing Season, as to form 'em into regular Heads; but this should not be done with Sheers (as is the common Practice, whereby their Leaves are cut, and render'd very unsightly), but rather skilfully pruned with a Knife, allowing their Branches a proportionable Distance to the Breadth of their Leaves, which will be close enough to render them beautiful, and at the same time will encourage their Flowering: For when they are continually clipp'd, their Branches are very weak, and do often decay in the Middle, and their Flowers are never so large,

nor produc'd in so great Plenty as when they have a greater Distance allow'd to their Shoots.

In this Nursery the Plants may remain four or five Years, during which time they should be carefully clear'd from Weeds, and the Ground dug every *Spring*; in doing of which their Roots should be carefully cut round, to cause 'em to produce more Fibres, whereby they may be removed with greater Safety, because the Earth will be the better supported by their Roots. The best time to transplant them is about the Beginning of *April*, as hath been directed for most Sorts of *Evergreens*, that being the Season they begin to shoot.

These Shrubs are very ornamental, when planted in the lower Part of Clumps, and other Plantations of *Evergreens*, if they are mix'd with other Plants of the same Growth; and in these Plantations they will not be so liable to suffer by Frost, because their Stems will be defended by the neighbouring Plants.

There are some who make Hedges of these Plants, but they are by no means proper for that Purpose, because their Leaves are large, which occasions their Branches to be produced at a farther Distance, and these when cut do appear very unsightly; besides, by the frequent cutting of them, it prevents their flowering, so that the greatest Beauty of the Plants is lost; for they should never be pruned after the Beginning of *May*, unless some very luxuriant Shoots are produced, which grow greatly out of Order; these may be shorten'd, or entirely displaced, according as the Plants may require; and this one Pruning every *Spring* will be sufficient to keep 'em constantly in Order, without injuring their Flowering, which should always be avoided.

TITHYMALOIDES, [of *πθιμαλ* and *ἰδω*, Shape.] Bastard Spurge.

The Characters are;

The Flower consists of one Leaf, and is in Shape somewhat like a Slipper; whose Pointal afterwards becomes a tricapsular Fruit like that of Spurge.

The Species are;

1. *TITHYMALOIDES*; frutescens, folio Myrti amplissimo. *Tourn.* The American, shrubby, laurel-leav'd Spurge, vulgō.

2. *TITHYMALOIDES*; frutescens, foliis nerii. *Plum.* Shrubby Bastard Spurge with an Oleander Leaf.

These Plants are very common in the warm Parts of *America*, where the first is known by the Name of *Poison-weed*, under which Appellation I received it from *Barbadoes*; this Sort is now pretty common in the Gardens of those who are curious in preserving tender exotick Plants, but the second Sort is yet very rare in the *English* Gardens.

They are both propagated by Cuttings, which may be taken from the Plants during any of the *Summer* Months, and after having lain in a dry Place for a Fortnight or three Weeks, until the wounded Part be healed over, they should be planted into small Pots, fill'd with light, sandy Earth, mix'd with Lime-

Lime-rubbish, and then plunged into a Hot-bed of Tanners-bark, observing now and then to refresh them gently with Moisture; but they should never receive much Wet, which will rot them.

After they have taken Root they may have a greater Share of Air, by raising the Glasses, but they must never be expos'd to the open Air: In this Bed they may remain until the Beginning of October, when they must be removed into the Stove, and placed with the Melon and Torch-Thistle, in a warm, dry Situation, and during the Winter Season they should have very little Water, which if given in Plenty, seldom fails to rot 'em. In the Spring these Plants should be again placed into a Bark-bed, which will greatly promote their Growth, and will cause 'em to produce Flowers, which they seldom do when kept dry upon Shelves in the Stove, nor will they make any considerable Progress in such a Situation.

These Plants are preserved for their odd Appearance amongst other succulent Plants, their Leaves being very large, thick, and full of a milky acrid Juice.

TITHYMALUS, [*τιθύμαλλον*, so called of *τιθι*, a Pap or Teat, and *μαλακός*, soft, q. d. soft Pap, because this Plant produces Milk. One Sort is call'd *Characias*, i. e. belonging to a Valley, of *χαράκιον*, to make a Trench, on account of its growing in a Valley. Another Sort is called *Peplos*, which was an Ornament that Women made use of, which being spread out served for a Veil. A third Sort is call'd *Cataputia*, a Medicament that is swallowed at one Gulp.] Spurge.

The Characters are;

The Flower consists of one Leaf, which is of the globous, Bell-shape, cut into several Moon-shap'd Segments, and encompass'd by two little Leaves, which seem to perform the Office of a Flower-cup; the Pointal, which is for the most part triangular, rises from the Bottom of the Flower, and afterwards becomes a Fruit of the same Shape, divided into three seminal Cells, in each of which is contained one oblong Seed. To these Notes should be added, It has a milky Juice abounding in every Part of the Plant.

The Species are;

1. **TITHYMALUS**; *latifolius*, *cataputia dictus*. H. L. Broad-leav'd Spurge, called Cataputia.
2. **TITHYMALUS**; *characias*, *amygdaloides*. C. B. P. Wood Spurge with Almond-like Leaves.
3. **TITHYMALUS**; *characias*, *amygdaloides*, *foliis eleganter variegatis*. Flor. Bat. Wood Spurge with beautiful strip'd Leaves.
4. **TITHYMALUS**; *maritimus*. C. B. P. Sea Spurge.
5. **TITHYMALUS**; *myrsinites*, *latifolius*. C. B. P. Broad Myrtle-leav'd Spurge.
6. **TITHYMALUS**; *palustris*, *fruticosus*. C. B. P. Shrubby Marsh Spurge, commonly called the Greater Esula of the Shops.
7. **TITHYMALUS**; *foliis pini*, *forte Diosco-*

ridis pityusa. C. B. P. Pine-leav'd Spurge, called the Lesser Esula of the Shops.

8. **TITHYMALUS**; *Indicus frutescens*. Raii Hist. Indian shrubby Spurge.

9. **TITHYMALUS**; *Indicus*, *vimineus*, *penitus apbyllos*. Boerb. Ind. Indian Spurge with slender straggling Branches without Leaves.

10. **TITHYMALUS**; *arboreus*. Alpin. Tree Spurge with Myrtle Leaves.

11. **TITHYMALUS**; *Creticus*, *characias*, *angustifolius*, *villosus* & *incanus*. T. Cor. Woody Spurge of Candia, with narrow, hairy, and hoary Leaves.

There are a great Number more of Species of less Note, which are seldom cultivated in Gardens, so I shall not enumerate them here, those already mention'd being the most valuable Sorts.

The first is a biennial Plant, which will scatter its Seeds, and the Plants will come up without any Care, which will flower and feed the following Summer, after which the Plants will die; these Plants come up much better when the Seeds fall of themselves, than if sown with great Care, nor will they bear Removing, unless it be done while they are young; because they generally send forth a Tap-root, which is often broken by transplanting, and thereby the Plant destroy'd. This is order'd by the College of Physicians to be used in Medicine, under the Title of *Cataputia minor*, for which Reason it is preserv'd in some Gardens, though there is no great Beauty in the Plant.

The second Sort is found wild in Woods and other shady Places in divers Parts of England, but is worthy of a Place in small Wilderness Quarters, or in other shady Plantations, where it will thrive very well, and in the Spring will produce great Tufts of Flowers, which although not very beautiful, yet are of a singular Figure and Colour, and will add to the Variety of the Place. These Plants may be taken out of the Woods in Autumn, and transplanted into the Places where they are design'd, in which, if they are once establish'd, they will sow their Seeds, and thereby be continued; but if they are not placed under the Shelter and Shadow of Trees, they will not thrive so well.

The third Sort is a Variety of the second; the Leaves of this Kind are beautifully strip'd, so as to appear of three Colours: This may be propagated by Cuttings, which should be planted in Pots, filled with light sandy Earth, and placed in the Shade until they have taken Root, after which they may be placed amongst other curious Plants, where they may be screen'd from the Violence of the Sun in Summer, and in Winter they must be shelter'd under a Frame from hard Frost, which will destroy them, but they must have the free Air in mild Weather, and not too much Wet in Winter.

The fourth Sort is found wild upon the Sea Coasts in several Places in England, from whence it has been transplanted into several Gardens: This may be propagated by sowing the

the Seeds, or by Cuttings, which must be planted in the *Spring*, upon a gravelly poor Soil, in which this Plant will endure the Cold of our ordinary *Winters* very well, but in very severe Frosts it is often destroy'd. This is preserved in some Gardens, more for the Sake of its Variety than Beauty.

The fifth Sort may also be propagated either by sowing its Seeds or planting Cuttings, in the same manner as the former, but must have a dry Soil, and a warm Situation, otherwise the Cold will destroy it in *Winter*. This Plant trails upon the Ground, so should be planted at a Distance from other Plants, because if it be over-hung by 'em it will not thrive, and the Branches of this will many times extend themselves two Feet from the Root, so that if it has not Room, they will rot and die away.

The sixth Sort grows wild in marshy Places in *France*, *Italy*, and *Germany*, but in *England* it is preserved in some curious Botanick Gardens, it being an officinal Plant. This may be propagated by parting the Roots, and planting Cuttings in the *Spring*, which must be done in a light Soil and an open Situation, where it will grow four or five Feet high, and become very shrubby; so that the Plants must be allowed at least two Feet Room to grow, otherwise they will over-bear each other, or whatever Plants stand near 'em. There is not much Beauty in this Sort, but as it is a medicinal Plant, it should have a Place in Physick Gardens.

The seventh Sort is a very hardy Plant, and propagates itself by its creeping Roots, so that if it be not confined in Pots, it will spread over the Ground where-ever it is planted, so as not to be easily kept within Bounds. This being a medicinal Plant, should also have a Place in Physick Gardens, but there is not much Beauty in it to recommend it to the Curious.

The eighth, ninth, and tenth Sorts are tender Plants, which come from warm Countries; and in *England* are preserved with great Care in Stoves, amongst other curious succulent Plants. These are propagated by Cuttings, which should be cut from the old Plants at a Joint, and laid in a dry Part of the Stove for a Fortnight, that the wounded Part may heal over; then they should be planted in small Pots, filled with light sandy Earth, mix'd with Lime-rubbish, and plunged into a Hot-bed of Tanners-bark, where they should remain until they have taken Root, after which they should be inured to the Air by Degrees, and then be removed into the Stove, where they must constantly be kept, for they are too tender to be expos'd abroad in the Heat of *Summer*; therefore they should be placed near the Glasses of the Stove in *Summer*, where they may have Air in very hot Weather, but they must not have much Wet, being very full of Moisture, and subject to rot if over watered. In *Winter* they must be set in a warm Part of the Stove, and should have very little Wet during that Season: With this

Management these Plants will thrive and grow very large, but they seldom produce Flowers in this Country.

The eleventh Sort was found by Monsieur *Tournefort* in the *Levant*, and by him brought into *Europe* by the Name here given to it, though many curious Botanists are not satisfied how it differs from the *Tithymalus characias rubens peregrinus* of *Caspar Bauhinus*. This has a great deal of the Appearance of our *Wood Spurge*, but the Stalks are redder, and the Flowers are much fairer: It may be propagated by Cuttings, which should be planted in Pots, filled with light sandy Earth, and in *Winter* must be shelter'd, otherwise it is apt to perish with severe Cold. In *March* it flowers, at which time it makes a beautiful Appearance, and is worthy of a Place in every good Garden.

TOAD-FLAX; *vide* *Linaria*.

TOBACCO; *vide* *Nicotiana*.

TOMENTUM, is that soft, downy Substance, which grows on the Leaves of some Plants.

TOXICODENDRON, [of *πένον*, *Poison*, and *δένον*, a Tree.] Poison-tree, *vulgô*.

The Characters are;

The Flower consists of five Leaves, which are placed orbicularly, and expand in Form of a Rose; out of whose Flower-cup rises the Pointal, which afterwards becomes a roundish, dry, and for the most part, furrowed Fruit, in which is contain'd one compress'd Seed.

The Species are;

1. TOXICODENDRON; *triphyllum, glabrum*. *Tourn.* Three-leav'd smooth Poison-tree.

2. TOXICODENDRON; *triphyllum, folio sinuato pubescente*. *Tourn.* Three-leav'd Poison-tree with a sinuated hairy Leaf.

3. TOXICODENDRON; *Carolinianum, foliis pinnatis, floribus minimis herbaceis*. *Carolina* Poison Ash, *vulgô*.

The two first Species were brought from *Virginia*, many Years since, where they grow in great Plenty, as it is probable they do in most other Northern Parts of *America*. The first Sort seldom advances in Height, but the Branches trail upon the Ground, and send forth Roots, by which they propagate in great Plenty.

The second Sort will grow upright, and make a Shrub about four or five Feet high, but rarely exceeds that in this Country. This may be propagated by Layers, and is equally as hardy as the former.

The third Sort was rais'd from Seeds, which were sent from *Carolina* by Mr. *Catesby*. This is somewhat tenderer than either of the former, but will endure the Cold of our ordinary *Winters* very well, especially if it be planted near the Shelter of other Trees.

These Plants are preserved by the Curious in Botany, for the Sake of Variety, but as there is little Beauty in them, so they are not much cultivated in *England*. The Wood of these Trees, when burnt, emits a noxious Fume,

Fume, which will suffocate Animals when they are shut up in a Room where it is burnt: An Instance of this is mention'd in the *Philosophical Transactions* by Dr. William Sherard, which was communicated to him in a Letter from New England by Mr. Moore, in which he mentions some People who had cut some of this Wood for Fuel, which they were burning, and in a short time they lost the Use of their Limbs and became stupid; so that if a Neighbour had not accidentally open'd the Door, and saw them in that Condition, it is generally believ'd they would soon have perish'd. This should caution People from making use of this Wood.

TRAGACANTHA, *τραγανθα* of *τραγος*, a Goat, and *ανθα*, a Thorn.] Goats-thorn.

The Characters are;

It hath a papilionaceous Flower, out of whose Empalement arises the Pointal, which afterwards becomes a bicapsular Pod, fill'd with Kidney-shap'd Seeds. To these Notes must be added, The Leaves grow by Pairs on a middle Rib, which always ends in a Thorn.

The Species are;

1. **TRAGACANTHA**; *Massiliensis*. *J. B.* Goats-Thorn of Marseilles.

2. **TRAGACANTHA**; *Cretica, incana, flore parvo, lineis purpureis striato*. *T. Cor.* Hoary Goats-thorn of Crete, with a small Flower strip'd with purple Lines.

3. **TRAGACANTHA**; *humilis Balearica, foliis parvis vix incanis, flore albo*. *Salvad.* Low Balearic Goats-thorn, with small Leaves and a white Flower.

There are many other Species of this Plant which grow wild in the Islands of the Archipelago; but those here mention'd are all the Sorts I have yet seen cultivated in the English Gardens.

These Plants may be propagated either from Seeds or by Cuttings, but as they rarely produce Seeds in this Country, so the latter Method is only used here. The best Time for this Work is in April, just as the Plants begin to shoot; at which Time the tender Branches of the Plants should be taken off, and their lower Parts divested of the decay'd Leaves; then they should be planted on a very moderate Hot-bed, which should be cover'd with Mats, to screen them from the great Heat of the Sun by Day, and the Cold by Night: These Cuttings should be frequently water'd until they have taken Root; after which they may be expos'd to the open Air, observing always to keep them clear from Weeds, and in very dry Weather they must be refresh'd with Water.

On this Bed they may remain until the following Spring, where, if the Winter should be very severe, they may be cover'd with Mats, as before, and in April they may be transplanted out either into Pots fill'd with sandy, light Earth, or into warm Borders, where, if the Soil be dry, gravelly, and poor, they will endure the severest Cold of our Climate; but if they are planted in a very rich Soil, they often decay in Winter.

From the second Sort Monsieur Tournesfort says, the Gum *Adragant* or *Dragon* is produc'd in Crete; of which he gives the following Relation in his Voyage to the Levant: "We had the Satisfaction of fully observing the Gum *Adragant* on Mount *Ida*. I cannot understand how *Bellonius* comes to assert so positively, that there is no such thing in *Candia*: Sure he had not read the first Chapter of the ninth Book of *Theophrastus's* History of Plants. The little bald *Hillocks* about the *Sheepfold* produce much of the *Tragacantha*, and that too a very good Sort. *Bellonius* and *Prosper Alpinus* were doubtless acquainted with it; tho' it is hardly possible, from their Descriptions, to distinguish it from the other Kinds they make mention of. This Shrub spontaneously yields the Gum *Adragant* towards the End of June, and in the following Months; at which time, the nutritious Juice of this Plant, thicken'd by the Heat, bursts open most of the Vessels wherein it is contain'd. It is not only gather'd in the Heart of the Trunk and Branches, but also in the Interspaces of the Fibres, which are spread in the Figure of a Circle like Rays of the Sun. This Juice is coagulated into small Threads, which passing through the Bark, issue out by little and little, according as they are protruded by the fresh Supplies of Juice arising from the Roots. This Substance being expos'd to the Air, grows hard, and is form'd either into Lumps, or slender Pieces, curl'd and winding in the Nature of Worms, more or less long, according as Matter offers. It seems as if the Contraction of the Fibres of this Plant contributes to the expressing of the Gum. These delicate Fibres, as fine as Flax, being uncover'd, and trodden by the Feet of the Shepherds and Horses, are by the Heat shrivell'd up, and facilitate the Emanation of the extravasated Juices."

But notwithstanding what Tournesfort has said concerning the Gum *Adragant* being produc'd from that particular Species, many Authors are of Opinion, that it is taken from several other Species, but particularly that of *Marseilles*, from whence that Gum is often brought into England.

TRAGOPOGON, [*τραγοποιον*, of *τραγος*, a Goat, and *ποιον*, a Beard, because the pappous Seed, while it is included in the Calix, resembles the Beard of a Goat.] Goats-beard.

The Characters are;

It is a Plant with a semisflosculous Flower, consisting of many half Florets; these, with the Embryo's are included in one common many-leav'd Flower-cup, which is not scaly as in *Scorzonera*, but the Segments are stretch'd out above the Florets; the Embryo's afterwards become oblong Seeds inclos'd in Cover's or Coats, and have a thick Down like a Beard adhering to them.

The Species are;

1. **TRAGOPOGON**; *pratense, luteum, majus*. *C. B. P.* Greater Meadow Goats-beard, with
8 B a yellow

a yellow Flower, commonly call'd Go-to-Bed-at-Noon.

2. TRAGOPOGON; *purpureo-ceruleum, porri folio quod Artifi; vulgò. C. B. P.* Goats-beard, with a Leaf like Leeks, and a purple blue Flower, commonly call'd Salsafy or Salsafy.

3. TRAGOPOGON; *alter, gramineo folio, suave-rubens. Col.* Another Goats-beard, with a grassy Leaf, and soft red Flowers.

There are several other *Species* of this Plant, which are preserv'd in some curious Botanick Gardens for the Sake of Variety; but as they are not cultivated for Use, so I shall omit enumerating them in this Place.

The first Sort here mention'd grows wild in moist Meadows in divers Parts of England; and in May, when the Stems begin to advance, they are by many People gather'd to boil, and are by some preferr'd to *Asparagus*.

The second Sort was formerly more in Esteem than at present: This was brought from Italy, and cultivated in Gardens for Kitchen Use, the Roots being by some People greatly valued; but of late there is but little cultivated for the Markets, tho' several Gentlemen preserve it in Gardens to supply their Tables.

The third Sort is by some preserv'd for the Variety of its Flowers.

These Plants are propagated from Seeds, which should be sown in the Spring upon an open Spot of Ground, in Rows about nine or ten Inches distant; and when the Plants are come up, they should be hoed out, leaving them about six Inches asunder in the Rows: the Weeds should also be carefully hoed down as they are produc'd, otherwise they will soon over-bear the Plants, and spoil them. This is the only Culture they require; and if the Soil be light, and not too dry, they will make large Plants before Winter; at which time the *Salsafy*, whose Roots are the most valuable Part, will be fit for Use, and may be taken up any time after their Leaves are decay'd; but when they begin to shoot again, they will be sticky, and not fit for Use.

The common yellow Sort, whose Shoots are preferr'd, will be fit for Use in April or May, according to the Forwardness of the Season: The best time to cut them is, when their Stems are about four Inches long; for if they stand too long, they are never so tender as those which are cut while young.

Some People in cultivating these Plants, sow their Seeds in Beds pretty close, and when the Plants come up, they transplant them out in Rows at the before-mention'd Distance; but as they do always form a Tap-root, which abounds with a milky Juice, so when the extrem Part of their Roots are broken by transplanting, they do seldom thrive well afterward; therefore it is by far the better Way to make shallow Drills in the Ground, and scatter the Seeds therein, as before directed, whereby the Rows will be at a due Distance, and there will be nothing more to do than to hoe out the Plants when they are too thick in the Rows, which will be much less Trouble

than the other Method of transplanting, and the Plants will be much larger and fairer.

TRANSPLANTING of TREES; *vide* Planting.

TRANSPORTATION of PLANTS: In sending Plants from one Country to another, great Regard should be had to the proper Season for doing it: For Example, if a Parcel of Plants are to be sent from a hot Country to a cold one, they should be sent in the Spring of the Year, that as they come towards the colder Parts, the Season may be advancing, and hereby, if they have suffer'd a little in their Passage, there will be time to recover them before Winter; whereas those which arrive in Autumn are often lost in Winter, because they have not time to recover and get Root before the Cold comes on.

On the contrary, those Plants which are sent from a cold Country to a hot one, should always be sent in Winter, that they may arrive time enough to be rooted before the great Heats come on, otherwise they will soon perish.

The best Way to pack up Plants for a Voyage, (if they are such as will not bear to be kept out of the Ground) is, to have some handy Boxes with Handles to them, for the more easily removing them in bad Weather: These should have Holes bored in their Bottoms to let out the Moisture, otherwise it will rot the Roots of the Plants. Over each of these Holes should be laid a flat Tile or Oyster-shell, to prevent the Earth from stopping them; then they should be fill'd up with Earth, into which the Plants should be set as close as possible to each other, in order to save Room, (which is absolutely necessary, otherwise they will be very troublesome in the Ship); and as the only thing intended is, to preserve them alive, and not to make any Progress while on their Passage, so a small Box will contain many Plants, if rightly planted. The Plants should also be plac'd in the Box a Fortnight or three Weeks before they are put on Board the Ship, that they may be a little settled and rooted; and during the Time they are on Board, they should remain, if possible, on the Deck, that they may have Air; but in bad Weather they should be cover'd with a Tarpawlin, to guard them against the Salt Water, which will destroy them if it comes at 'em in any Quantity.

The Water these Plants should have, while on Board, must be proportion'd to the Climate where they come from, and to which they are going: If they come from a hot Country to a cold one, then they should have very little Moisture, after they have passed the Heats; but if they are carry'd from a cold Country to a hot one, they must have a greater Share of Moisture when they come into a warmer Climate, and should be shaded in the Day from the violent Heat of the Sun, to which, if they are too much expos'd, it will dry them up and destroy them.

But if the *Plants* to be sent from one Country to another, are such as will live out of the Ground a considerable time, as all those which are full of Juice will do; as the *Sedums*, *Ficoides*, *Euphorbiums*, *Cereus's*, &c. then they require no other Care but to pack them up in a close Box, wrapping them up well with *Moss*, observing to place them so closely that they may not be tumbled about, which will bruise them, and that those *Plants* which have Spines may not wound any of the others. The Box also should be plac'd where they may receive no Moisture, and where Rats cannot come to them, otherwise they are in Danger of being eaten by those Vermin.

If these *Plants* are thus carefully pack'd up, they will do well, tho' they should be two, three, or some Sorts, if they are four or five Months on their Passage, and will be less liable to suffer than if planted in Earth, because the Sailors generally kill these *Plants* by over-watering them.

There are also several Sorts of Trees which may be pack'd up in Chests with Moss about them, which will bear to be kept out of the Ground two or three Months, provided it be at a Season when they do not grow; as may be seen by the *Orange-Trees*, *Jasmines*, *Capers*, *Olive* and *Pomegranate-Trees*, which are annually brought from *Italy*, and if skillfully managed, very few of them miscarry, notwithstanding they are many times kept three or four Months out of the Ground.

In sending Seeds from one Country to another, the great Care to be taken is, to secure them from Vermin, and preserve them dry, otherwise they mould and decay. The Method Mr. *Catesby* always observ'd was, to put up his Seeds dry into Papers, and then put them into a dry Gourd-shell, and seal them up; in which Way he sent several large Parcels of Seeds from *Carolina* to *England*, which never miscarry'd. There are some Persons who have directed to put them into Glasses, and to seal them closely down, to keep out the external Air; but from several Experiments of this kind which I have made, I find Seeds thus closely put up will not grow, if they remain stopp'd up any considerable time, all Seeds requiring some Share of Air to preserve their vegetating Quality: So that where a Person has no other Convenience, they may be put up in a Bag, and hung up in a dry Part of the Ship, or put into a Trunk, where they may be safe from Vermin; in which Places they will keep very well.

N. B. It is the safest Way to bring all Sorts of Seeds in their Pods or Husks in which they grew, provided they are put up dry, because their own Covering will afford them some Nourishment if the Seeds are not separated from the *Placenta*.

TRIFOLIUM; [of tres, three, and folium, Lat. a Leaf.] Trefoil.

The Characters are;

It hath a papilionaceous Flower, or resembles a papilionaceous Flower, for it consists of the Standard; the Wings and the Keel coming out

of the Empalement, together with the Pointal, cover'd with its fringed Sheath; it becomes a Capsule, bidden in the Empalement, and full of Seeds, which are for the most part shap'd like a Kidney, adhering close to the Capsule when ripe. Some of this Genus have Flowers consisting of one Leaf, resembling a papilionaceous Flower, out of whose Empalement arises the Pointal, which afterward becomes a membranaceous Capsule bidden in the Empalement, and fill'd with Kidney-shap'd Seeds. To these Notes must be added, Leaves growing by Threes, seldom by Fours, or Fives, on a common Footstalk.

The Species are;

1. **TRIFOLIUM**; *purpureum, majus sativum, pratense simile*. Raii Syn. Greater purple manured Trefoil, commonly call'd Clover.

2. **TRIFOLIUM**; *pratense, purpureum vulgare*. Mor. Hist. Common Meadow Trefoil, with a purple Flower, commonly call'd Honey-suckle Trefoil.

3. **TRIFOLIUM**; *pratense album*. C. B. P. White Meadow Trefoil.

4. **TRIFOLIUM**; *arvense, humile, spicatum, five Lagopus*. C. B. P. Hare's-foot Trefoil.

5. **TRIFOLIUM**; *fragiferum*. Ger. Emac. Strawberry-Trefoil.

6. **TRIFOLIUM**; *pratense luteum, capitulatum, vel agrarium*. C. B. P. Hop-Trefoil.

7. **TRIFOLIUM**; *bitumen redolens*. C. B. P. Trefoil, smelling of Bitumen.

8. **TRIFOLIUM**; *bitumen redolens, angustifolium*. Boerb. Ind. Narrow-leav'd Trefoil; smelling of Bitumen.

9. **TRIFOLIUM**; *Africanum, fruticans, flore purpurascens*. H. Amst. African shrubby Trefoil, with a purplish Flower.

The first of these *Plants* is greatly cultivated in *England* for feeding of Cattle, and is esteem'd very profitable; because the great Quantity of Cattle which this Grass will maintain, does very much enrich all clayey Lands, and prepare them for Corn in two or three Years, which is the Length of Time which this Crop will continue good.

In the Choice of this Seed, that which is of a bright yellowish Colour, a little inclining to Brown, should be prefer'd; but that which is Black, should be rejected as good for little.

Ten or twelve Pounds of this Seed will be sufficient for an Acre of Ground; for if the *Plants* do not come up pretty thick, it will not be worth standing. The Land in which this Seed is sown should be well ploughed, and harrowed very fine, otherwise the Seeds will be buried too deep, and thereby lost.

The best time to sow it is about the Beginning of *August*, at which time the Autumnal Rains will bring up the *Plants* in a short time; whereas when the Seeds are sown in the *Spring*, if it be done very early, they are many times burst with Wet and Cold; and if it be done late, they are in Danger of miscarrying from Drought. Whereas in *Autumn*, when the Ground has been warm'd by the *Summer's* Heat, the Rains then falling, do greatly promote the Vegetation of Seeds and *Plants*.

This

This Seed should be harrow'd in with Bushes, for if it be done with a common Harrow, they will be bury'd too deep.

Most People have recommended the sowing of this Seed with several Sorts of Corn; but if it be sown at the Season before directed, it will be much better, if sown alone; for the Corn prevents the Growth of the Plants until it is reaped and taken off the Ground; so that one whole Season is lost, and many times, if there be a great Crop of Corn upon the Ground, it often spoils the *Clover*, so that it is hardly worth standing; whereas in the Way before directed, the Plants will have good Root before *Winter*, and in the *Spring* will come on much faster than that which was sown the *Spring* before under Corn.

About the Middle of *May* this Grass will be fit to cut, when there should be great Care taken in mixing it, for it will require a great deal more Labour and Time to dry than common Grass, and will shrink into less Compass; but if it be not too rank, it will make extraordinary rich Food for Cattle. The Time for cutting it is when it begins to flower, for if it stands much longer, the lower Part of the Stems will begin to dry, whereby it will make a less Quantity of Hay, and that not so well flavoured.

Some People cut three Crops in one Year of this Grass, but the best Way is to cut but one in the *Spring*, and feed it the remaining Part of the Year, whereby the Land will be enriched, and the Plants will grow much stronger.

One Acre of this Grass will feed as many Cattle as four or five Acres of common Grass: But great Care should be taken of the Cattle when they are first put into it, lest it burst them. To prevent which, some turn them in for a few Hours only at first, and so stint them as to Quantity, and this by degrees, letting them at first be only one Hour in the Middle of the Day, when there is no Moisture upon the Grass, and so every Day suffer them to remain a longer time, until they are fully season'd to it: But great Care should be had never to turn them into this Food in wet Weather; or if they have been for some time accustomed to this Food, it will be proper to turn them out at Night in wet Weather, and let them have Hay, which will prevent the ill Consequences of this Food: But there are some who give Straw to their Cattle while they are feeding upon this Grass, to prevent the ill Effects of it; which must not be given them in the Field, because they will not eat it where there is Plenty of better Food. There are others who sow Rye Grass amongst their *Clover*, which they let grow together, in order to prevent the ill Consequences of the Cattle feeding wholly on *Clover*: But this is not a commendable Way, because the Rye Grass will greatly injure the *Clover* in its Growth.

Where the Seeds are design'd to be sown, the first Crop in the *Spring* should be permitted to stand until the Seeds are ripe, which may be known by the Stalks and Heads changing

to a brown Colour; then it should be cut in a dry Time: And when it is well dry'd, it may be hous'd until *Winter*, when the Seeds should be thresh'd out; but if the Seeds are wanted for immediate sowing, it may be thresh'd out before it be hous'd or stack'd, but then it must be well dry'd, otherwise the Seeds will not quit their Husks.

It has been a great Complaint amongst the Farmers, that they could not thresh out these Seeds without great Labour and Difficulty, which I take to be chiefly owing to their cutting the *Spring* Crop when it begins to flower, and to leave the second Crop for Seed, which ripens so late in *Autumn*, that there is not Heat enough to dry the Husks sufficiently, whereby they are tough, and the Seeds render'd difficult to get out, which may be intirely remedied by the leaving of the first Crop for Seed, as hath been directed.

When Cattle are fed with this Hay, the best Way is to put it in Racks, otherwise they will tread a great Quantity of it down with their Feet. This Feed is much better for most other Cattle than Milch Cows, so that these should rarely have any of it, lest it prove hurtful to them; tho' when it is dry, it is not near so injurious to any sort of Cattle as when green.

The second and third Sorts grow wild in Meadows amongst the Grass, where their Roots will abide many Years, and are cut with the Grass, and dry'd for Food: But these are rarely cultivated in *England*, because they are Plants of much smaller Growth than the *Clover*.

The fourth Sort is an annual or biennial Plant, which perishes as soon as the Seeds are ripe. This grows wild in divers Parts of *England* amongst Corn, or upon other arable Land, and is seldom cultivated unless in Botanic Gardens, it being a medicinal Plant.

The fifth and sixth Sorts do also grow wild in *England*, but are often preserv'd in *Botanick* Gardens for Variety. The fifth Sort produces Heads very like a *Strawberry*, from whence it had its Name; and the sixth Sort has Heads very like *Hops*, for which Diversity they are sometimes cultivated in Gardens, but they are not apply'd to any Use.

The seventh, eighth, and ninth Sorts are also preserv'd in Gardens for Variety, where they are planted in Pots, and shelter'd in *Winter* amongst other Exotick Plants; but the seventh and eighth Sorts will endure the Cold of our ordinary *Winters* in the open Air, provided they are planted on a dry Soil, and in a warm Situation; but the ninth Sort requires to be shelter'd from severe Frost, but should have as much free Air as possible in mild Weather.

These Plants may be propagated either from Seeds, or by planting Cuttings of them in the *Spring*, upon a Bed of rich, light Earth, observing to water and shade them until they have taken Root; after which they must be carefully clear'd from Weeds during the *Summer* Season, and in *August* some of the Plants should be taken up and planted in Pots fill'd with light, sandy Earth; which in *Winter* should

should be plac'd under a common Hot-bed Frame, where they may have Air in mild Weather; but in frosty Weather may be shelter'd with Glasses, &c. If they are propagated from Seeds, these should be sown towards the latter End of *March* upon a Bed of light Earth, and when the Plants are come up, they must be carefully clear'd from Weeds, that they may not be over-born thereby; and when they are about four Inches high, they should be planted either into Pots, or the Borders where they are to remain, because if they are suffer'd to grow very rank before they are remov'd, they do not bear transplanting so well. These Plants are preserv'd in Gardens more for the Sake of Variety than any real Beauty, especially the two first, which smell so strong of *Bitumen*, when bruise'd, as scarcely to be born without Uneasiness.

TRIPETALOUS FLOWERS, are such as consist of three Leaves, which are call'd *Petals*, to distinguish them from the Leaves of Plants.

TRIPOLIUM; *vide* Aster.

TRITICUM; [so call'd of *Triturare*, Lat. to thresh, because the Seeds or Grains are separated from the Ears or Spikes by threshing.] Wheat.

The Characters are;

It hath an apetalous Flower, which is dispos'd into Spikes; each single Flower consists of many Stamina (or Threads), which are included in a squamous Flower cup, which hath Awns; the Pointal also rises in the Center, which afterwards becomes an oblong Seed, which is convex on one Side, but hath a Furrow on the other; is farinaceous, and enclos'd by a Coat which was before the Flower-cup: These are produc'd singly, and are collected in a close Spike, being affix'd to an indented Axis.

The Characters are;

1. **TRITICUM**; *hybernum, aristis carens*. C. B. P. White or red Wheat without Awns.

2. **TRITICUM**; *spica & granis rubentibus*. Raii Syn. Red Wheat, in some Places call'd Kentish Wheat.

3. **TRITICUM**; *spica & granis albis*. Raii Syn. White Wheat.

4. **TRITICUM**; *aristis circumvallatum, granis & spica rubentibus, glumis laevibus & splendens*. Raii Syn. Red-ear'd bearded Wheat.

5. **TRITICUM**; *spica villosa quadrata longiore, aristis munitum*. Hist. Ox. Cone Wheat.

6. **TRITICUM**; *aristatum, spica maxima cinericea, glumis hirsutis*. Raii Syn. Grey Wheat, and in some Places, Duckbill Wheat and Grey Pollard.

7. **TRITICUM**; *majus, longiore grano, glumis foliaceis incluso, seu Triticum Poloniae dictum*. Hist. Ox. Polonian Wheat.

8. **TRITICUM**; *spica multiplici*. C. B. P. Many-ear'd Wheat.

9. **TRITICUM**; *aestivum*. C. B. P. Summer Wheat.

10. **TRITICUM**; *spica bordei Londinensibus*. Raii Syn. Naked Barley, *vulgd.*

All these several Sorts of *Wheat* are cultivated in divers Parts of *England*, but the Manner of sowing and managing them being so well known to most Farmers, and being more proper for a Treatise of Husbandry than of Gardening, I shall omit mentioning it in this Place.

TUBEROSE; *vide* *Hyacinthus Tuberosus*.

TUBEROUS ROOTS, are such as consist of an uniform fleshy Substance, and are of a roundish Figure, as *Turnips*, &c.

TUBULOUS PLANTS, are such whose Stems are hollow like a Pipe

TULIPA, [is a *Turkish* Name, signifying a *Turkish* Cap or Turbant.] Tulip.

The Characters are;

It hath a Lily Flower, compos'd for the most part of six Leaves, shap'd somewhat like a Pitcher; the Pointal, which arises in the Middle of the Flower, surrounded with Stamina, afterwards becomes an oblong Fruit, which opens into three Parts, is divided into three Cells, and full of plain Seeds, which rest upon one another in a double Row. To these Marks must be added, a coated Root, with Fibres on the lower Part.

It would be to little Purpose to enumerate the several Varieties of these Flowers, which may be seen in one good Garden, since there is no End of their Numbers; and what some People may value at a considerable Rate, others reject; and as there are annually a great Quantity of new Flowers obtain'd from Breeders, so those which are old, if they have not very good Properties to recommend them, are thrown out and despis'd: I shall therefore point out the Properties of a good Tulip, according to the Characteristicks of the best Florists of the present Age. 1. It should have a tall, strong Stem. 2. The Flower should consist of six Leaves, three within, and three without; the former ought to be larger than the latter. 3. Their Bottom should be proportion'd to their Top, and their upper Part should be rounded off, and not terminate in a Point. 4. These Leaves, when open'd, should neither turn inward nor bend outward, but rather stand erect, and the Flower should be of a middling Size, neither over large nor too small. 5. The Stripes should be small and regular, arising quite from the Bottom of the Flower; for if there are any Remains of the former self-colour'd Bottom, the Flower is in Danger of losing its Stripes again. The Chives should not be yellow, but of a brown Colour. When a Flower has all these Properties, it is esteem'd a good one.

Tulips are generally divided into three Classes, according to their Seasons of Flowering; as, 1. *Præcoces* or Early Blowers, *Media's* or Middling Blowers, and *Serotine's* or Late Blowers; but there is no Occasion for making any more Distinctions than two, *viz.* Early and Late Blowers.

The Early Blowing Tulips are not near so fair, nor rise half so high as the Late ones,

but are chiefly valu'd for appearing so early in the *Spring*; some of which will flower the Beginning of *February*, if planted near a Wall, Pale, Hedge, or other Shelter; and the others do succeed them, so that they keep flowering until the general Season for these Flowers is come, which is towards the End of *April*. As these Early Blowing *Tulips* are but few, so I shall insert the Names of the principal of them; which are as follow:

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|--------------------------|-----------------------|
| 1. Duke Van Toll, or | 21. Vice Roy. |
| Winter Duke. | 22. Maria. |
| 2. General Duke. | 23. Aurora Van Bart. |
| 3. General Brancion. | 24. Paragon Grebberi. |
| 4. Pretty Betty. | 25. Galatea. |
| 5. Dutchess of Brancion. | 26. Marquis. |
| 6. Lac Verine. | 27. Gilden Bloemen. |
| 7. Violet Ratgans. | 28. Alcetus. |
| 8. Violet Remow or | 29. Ferweel Van Haer- |
| Pourpre Lisse. | lem. |
| 9. Palto Van Leyden. | 30. Jacbt Van Delft. |
| 10. Florisante. | 31. Goude Son. |
| 11. Blindenburgh. | 32. Flamboyant. |
| 12. Nonfuch. | 33. Bruyd Renard. |
| 13. Admiral Crinki. | 34. Palamedes. |
| 14. General Molfwick. | 35. Apollo. |
| 15. Paragon Cleremont. | 36. Juno. |
| 16. Admiral Encusen. | 37. Silver-boot. |
| 17. Morillion. | 38. Florida Voorhelm. |
| 18. Noblest. | 39. Roy d'Espagne. |
| 19. Early Perfect. | 40. Mertopolit. |
| 20. Superintendent. | 41. Konings-kroon. |

These are the Names which have been impos'd on these Flowers by the Florists of the several Countries where they were rais'd, and by which the Roots may be obtain'd from *Flanders* and *Holland*, where the Florists are very exact in keeping up their Lists of these Flowers compleat.

The Roots of these Early Blowing *Tulips* should be planted the Beginning of *September* in a warm Border, near a Wall, Pale, or Hedge, because if they are put into an open Spot of Ground, their Buds are in Danger of suffering by Morning Frosts in the *Spring*. The Soil for these should be renew'd every Year, where People intend to have them fair. The best Soil for this Purpose is that which is taken from a light sandy Pasture, with the Turf rotted amongst it, and to this should be added a fourth Part of Sea-sand. This Mixture may be laid about ten Inches deep, which will be sufficient for these Roots, which need not be planted more than four or five Inches deep at most. The Off-sets should not be planted amongst the blowing Roots, but in a Border by themselves, where they may be planted pretty close together, especially if they are small; but these should be taken up when their Leaves decay, in the same manner as the blowing Roots, otherwise they would rot, if the Season should prove very wet, for these are not so hardy as the late Blowers, nor do they increase half so fast as those, so that a greater Care is required to preserve the Off-sets of them.

When these *Tulips* come up in the *Spring*, the Earth upon the Surface of the Borders should be gently stirr'd and clear'd from Weeds, and as the Buds appear, if the Season should prove very severe, it will be of great Service to cover them with Mats; for want of which many times they are blighted, and their Flowers decay before they blow, which is often injurious to their Roots, as is also the cropping of the Flowers so soon as they are blown, because their Roots, which are form'd new every Year, are not at that time arriv'd to their full Magnitude, and are hereby depriv'd of their proper Nourishment.

If when these Flowers are blown, the Season should prove very warm, it will be proper to shade them with Mats, &c. in the Heat of the Day; as also if the Nights are frosty, they should be in like manner covered, whereby they may be preserved a long time in Beauty; but when their Flowers are decay'd, and the Seed-vessels begin to swell, they should be broken off just at the Top of the Stalks, because if they are permitted to seed, it will injure the Roots.

When the Leaves of these Flowers are decay'd, (which will be before the late Blowers are out of Flower) their Roots should be taken up, and spread upon Mats in a shady Place to dry; after which they should be clear'd from their Filth, and put up in a dry Place, where the Vermin cannot come to them, until the Season for planting them again, being very careful to preserve every Sort separate, that you may know how to dispose of them at the Time for planting them again; because it is the better Way to plant all the Roots of each Sort together (and not to intermix them, as is commonly practis'd in most other Kinds of Flowers) for as there are few of them which blow at the same Time, so when the several Roots of one Sort are scatter'd thro' a whole Border, they make but an indifferent Appearance; whereas when twenty or thirty Roots of the same Sorts are placed together, they will all flower at the same Time, and afford a more agreeable Prospect.

There are many curious Persons, who, in order to preserve their several Kinds of *Tulips*, and other bulbous-rooted Flowers separate, have large flat Boxes made, which are divided in several Parts by small Partitions, each of which is numbred in the same manner as the Divisions of their Beds; so that when a Catalogue of their Roots is made, and the Numbers fix'd to each Sort in the Beds, there is nothing more to do when they take up their Roots, but to put every Kind into the Division mark'd with the same Number which was placed to each Sort in the Bed, which saves a great deal of Trouble in making fresh Marks every Time the Roots are taken up, and effectually answers the Purpose of preserving the Kinds separate.

The several Sorts of these early-blowing *Tulips* do rise to different Heights in their Stems, so that scarcely any two of them do flower to an equal Height. The Duke Van Toll

Toll being one of the first that appears in the *Spring*, is generally very short stalk'd, and so the other Sorts in Proportion to their Earliness, are shorter than those which succeed them; and the late-blowing Kinds are all of them considerably longer in their Stems than any of the *Præcoces*, or Early-blowers; so that when they are confusedly mix'd together they make a very indifferent Appearance.

The late blowing *Tulips* are so numerous, that, as I before observ'd, it would be to no Purpose to attempt to make a Catalogue of them. These are generally obtain'd from Breeders, which is a Term apply'd to all such Flowers as are produc'd from Seeds, which are of one Self-colour, and have good Bottoms and Chives: These do, in time, break into various beautiful Stripes, according to the Ground of their former Self-colour: But this must be intirely thrown off, otherwise they don't esteem a Flower well broke.

Of these Breeders there hath been a great Variety brought into *England* from *Flanders* of late Years, which is the grand Nursery for most Sorts of Bulbous-rooted Flowers; but there are some curious Persons who have lately obtain'd many valuable Breeders from Seeds sown in *England*: And doubtless were we as industrious to sow the Seeds of these Flowers, as the People of *France* and *Flanders*, we might in a few Years have as great a Variety as is to be found in any Part of *Europe*: For altho' it is six or seven Years from the sowing before the Flowers do blow, yet if after the first sowing there is every Year a fresh Parcel sown, when the seven Years are expir'd, there will be constantly a Succession of Roots to flower every Year, which will reward the Expectation, and keep up the Spirit of Raising: But it is the Length of Time at first, which deters most People from the Beginning of this Work.

The Manner of propagating these Flowers from Seeds, is as follows. 1. You should be careful in the Choice of the Seed, without which there can be little Success expected. The best Seed is that which is sowed from Breeders which have all the good Properties before-related; for the Seeds of strip'd Flowers do seldom produce any thing that is valuable.

The best Method to obtain good Seeds, is to make Choice of a Parcel of such breeding *Tulip* Roots as you would save Seeds from, and plant 'em in a separate Bed from the Breeders, in a Part of the Garden where they may be fully expos'd to the Sun, observing to plant them at least nine Inches deep; for if they are planted too shallow, their Stems are apt to decay before the Seed is perfected.

These Flowers should always be expos'd to the Weather; for if they are shaded with Mats, or any other Covering, it will prevent their perfecting the Seed. About the Middle of *July* (a little sooner or later, as the *Summer* is hotter or colder), the Seeds will be fit to gather, which may be known by the Dryness of their Stalks, and the Opening of the

Seed-vessels, at which Time it may be cut off, and preserv'd in the Pods until the Season for sowing it, being careful to put it up in a dry Place, otherwise it will be subject to mould, which will render it good for little.

Having sav'd a Parcel of good Seed, about the Beginning of *September* is the best Season for sowing it; when there should be provided a Parcel of shallow Seed-Pans or Boxes, which should have Holes in their Bottoms to let the Moisture pass off: These must be fill'd with fresh, sandy Earth, laying the Surface very even, upon which the Seeds should be sown as regularly as possible, so that they may not lie upon each other, then there should be some of the same light, sandy Earth sifted over 'em, about half an Inch thick. These Boxes or Pans should be placed where they may have the Morning-Sun 'till eleven of the Clock, in which Situation they may remain until *October*; at which time they should be remov'd into a more open Situation, where they may enjoy the Benefit of the Sun all the Day, and be shelter'd from the North Winds, where they should remain during the *Winter* Season; but in the *Spring*, when the Plants are up, they should be again removed to their first Situation, and if the Season should be dry, they must be refresh'd with Water, while the Plants remain green, but as soon as their Tops begin to decay, there must be no more given them, lest it rot their tender Bulbs; therefore the Boxes should be placed in a shady Situation during the *Summer* Season, but not under the Drip of Trees.

These Plants at their first Appearance have very narrow Grassy Leaves, very like those of Onions, and do come up with bending Heads, in the same manner as they do, so that Persons who are unacquainted with them, may pull 'em up instead of Grass, whilst they are very young, before their Leaves are a little more expanded, which is rarely perform'd the first Year; for they seldom appear before the Middle of *March*, and they commonly decay about the latter End of *May* or the Beginning of *June*, according as the Season is hotter or colder.

The Weeds and Moss should also be clear'd off from the Surface of the Earth in the Boxes, and a little fresh Earth sifted over 'em soon after their Leaves decay, which will be of great Service to the Roots; these Boxes should be constantly kept clear from Weeds, which if permitted to grow therein, when they are pulled up, their Roots will be apt to draw the Bulbs out of the Ground; at *Michaelmas* they should be fresh earth'd again, and as the *Winter* comes on, so they must be again removed into the Sun as before, and treated in the same manner, until their Leaves decay in the *Spring*, when their Bulbs should be carefully taken up, and planted in Beds of fresh, sandy Earth, which should have Tiles laid under them, to prevent the Roots from shooting downward, which they often do when there is nothing to stop 'em, and thereby they are destroy'd. The Earth of these Beds should be about

about five Inches thick upon the Tiles, which will be sufficient for nourishing these Roots while they are young.

The Distance which these young Bulbs should be allow'd, need not be more than two Inches, nor should they be planted above two Inches deep; but toward the End of *October*, it will be proper to cover the Beds over with a little fresh Earth, about an Inch deep, which will preserve the Roots from the Frost, and prevent Moss or Weeds from growing over them. But if the *Winter* should be very severe, it will be proper to cover the Beds either with Mats or Pease-haulm, to prevent the Frost from entering the Ground, because these Roots are much tenderer while young, than they are after they have acquired Strength.

In the *Spring* the Surface of the Ground should be gently stirr'd, to make it clean, before the Plants come up; and if the *Spring* should prove dry, they must be frequently refresh'd with Water, during the Time of their Growth; but this must not be given to them in great Quantities, lest it rot their tender Bulbs; and when the Leaves are decay'd, the Weeds should be taken off, and the Beds covered with fresh Earth, which should also be repeated again in *Autumn*.

In these Beds the Bulbs may remain two Years, during which time they must be constantly kept clear from Weeds, and in *Spring* and *Autumn* fresh earth'd, in the Manner already directed; after which the Bulbs must be taken up, and planted into fresh Beds, at four Inches asunder, and as many deep, where they may remain two Years more, during which time they should have the same Culture as before: And after that, the Bulbs being large enough to blow, they should be taken up, and planted in fresh Beds, at the usual Distance, and in the same manner as old Roots; where, when they flower, such of them as are worthy to be preserved should be mark'd with Sticks, and at the Season for taking up the Bulbs, they must be separated from the others, in order to be planted as Breeders, in different Beds, but you should by no means throw out the rest, until they have flowered two or three Years, because it is impossible to judge exactly of their Value in less Time; for many which at first flowering do appear beautiful, will afterwards degenerate so as to be of little Value, and others which did not please at first, will many times improve, so that they should be preserved until their Worth can be well judged of.

In this Method many Sorts of new Breeders will be annually rais'd, from which there will always be fine Flowers broken, which being the Produce of a Person's own Sowing, will be greatly valued, because they are not in other Hands, which is what enhances the Price of all Flowers; and it has been entirely owing to this Method of raising new Flowers, that the *Dutch* have been so famous; amongst whom the Passion for fine *Tulips* did some time since reign so violently, that many of

the Florists near *Haerlem*, have often given an hundred Ducats for one single Root; which Extravagance was the Occasion of an Order being made by the *States*, to limit the utmost Price that should be afterward given for any *Tulip* Root, were it ever so fine.

Having thus given an Account of the Method of raising these Flowers from Seeds, I shall now proceed to the Management of such Roots which are term'd Breeders, so as to have some of them every Year break out into fine Stripes.

There are some who pretend to have Secrets how to make any Sort of Breeders break into Stripes whenever they please; but this I dare say is without Foundation; for from many Experiments which I have made in this kind, I never could find any Certainty of this Matter: All that can be done by Art, is, to shift the Roots every Year into fresh Earth, and a different Situation, by which Method I have had very good Success.

The Earth of these Beds should be every Year different; for although it is generally agreed, that lean, hungry, fresh Earth doth hasten their breaking, and cause their Stripes to be the finer, and more beautiful; yet, if they are every Year planted in the same Sort of Soil, it will not have so much Effect on them, as if they were one Year planted in one Sort of Earth, and the next Year in a very different one, as I have several times experienced.

The best Compost for these Roots is a third Part of fresh Earth from a good Pasture, which should have the Sward rotted with it; a third Part of Sea Sand; and the other Part sifted Lime-rubbish; these should be all mix'd together, six or eight Months at least before it is used, and should be frequently turned, in order to mix the Parts well together. With this Mixture the Beds should be made about eighteen Inches deep, after the following manner: After the old Earth is taken from out of the Bed to the Depth intended, then some of the fresh Earth should be put in about ten Inches thick, this should be levell'd exactly, and then Lines drawn each Way of the Bed, chequerwise; at six Inches distance, upon the Center of each Cross, should be placed the *Tulip* Roots, in an upright Position; and after having finish'd the Bed in this manner, the Earth must be filled in so as to raise the Bed eight Inches higher, observing in doing this, not to displace any of the Roots, and also to lay the Top of the Beds a little rounding, to throw off the Water.

There are many Persons who are so careless in Planting their *Tulip* Roots, as only to dig and level the Beds well, and then with a blunt Dibble to make Holes, into which they put the Roots, and then fill up the Holes with a Rake; but this is by no means a good Method, for the Dibble in making the Holes, presses the Earth closely on each Side and at the Bottom, whereby the Moisture is often detain'd so long about the Roots as to rot 'em; besides, the Earth being hard at the Bottom

Bottom of the Bulbs, they can't so easily emit their Fibres, which must certainly prejudice the Roots.

These Beds should be sunk, more or less, below the Surface, according to the Moisture or Dryness of the Soil, for the Roots should be so elevated as never to have the Water stand near 'em long, which is very apt to rot them. So that where the Soil is very wet, it will be proper to lay some Lime-rubbish under the Earth, in order to drain off the Wet, and the Beds should be entirely rais'd above the Level of the Ground; but to prevent their falling down into the Walks, after Frost or hard Rains, it will be proper to raise the Paths between them, either with Sea-Coal Ashes or Rubbish, eight or ten Inches, which will support the Earth of the Beds, and these Paths may slope at each End from the Middle, which will cause the Water to run off as it falls. But where the Soil is dry, the Beds may be sunk a Foot or fourteen Inches below the Surface, for in such Places the Beds need not be more than four or six Inches above the Surface, which will be Allowance enough for their Settling.

During the Winter Season there will be no farther Care required, the Roots being planted thus deep will be in no Danger of suffering by Frost; but in the Spring, when their Leaves begin to appear above-ground, the Earth, upon the Surface of the Beds should be stirr'd to clear it from Weeds, Moss, &c. and when the Flower-buds begin to come up, they should be guarded from Frost, otherwise they are very subject to blight and decay soon after they appear; but they need only be cover'd in such Nights when there is a Prospect of Frost, for at all other Times they should have as much open Air as possible, without which they will draw up weak, and produce very small Flowers.

When these Breeders are in Flower, you should carefully examine them, to see if any of them have broken into beautiful Stripes, which, if you observe, there should be a Stick put into the Ground, by every such Root, to mark 'em, that they may be separated from the Breeders, to plant amongst the strip'd Flowers the following Year; but you should carefully observe whether they have thrown off their former Colour entirely, as also when they decay, to see if they continue beautiful to the last, and not appear smear'd over with the original Colour, in both which Cases they are very subject to go back to their old Colour the next Year; but if their Stripes are distinct and clear to the Bottom, and continue so to the last (which is what the Florists call dying well), there is no great Danger of their returning back again, as hath been by some confidently reported; for if one of these Flowers is quite broken (as it is term'd), it will never lose its Stripes, though sometimes they will blow much fairer than at others, and the Offsets will often be more beautiful than the old Roots.

This Alteration in the Colour of these

Flowers may be seen long before they are blown, for all the green Leaves of the Plant will appear of a fainter Colour, and seem to be strip'd with White, or of a brownish Colour, which is a plain Proof that the Juices of the whole Plant are alter'd, or at least the Vessels through which the Juice is strain'd, so that hereby Particles of a different Figure are capable of passing through them, which, when enter'd into the Petals of the Flower, do reflect the Rays of Light in a different manner, which occasions the Variety we see in the Colours of Flowers (but this is more fully explained in the Article of *Vegetation*, which see.) This breaking of the Colours in Flowers proceeds from Weakness, or at least is the Cause of Weakness in Plants; for it is observable, that after *Tulips* are broken into fine Stripes, they never grow so tall as before, nor are the Stems, Leaves, or Flowers so large; and it is the same in all other variegated Plants and Flowers whatever, which are also much tenderer than they were before they were strip'd; so that many Sorts of Exotick Plants, which by Accident become variegated in their Leaves, are often render'd so tender as not to be preserv'd without great Care; though indeed, the Striping of *Tulips* doth never occasion so great Weakness in them; the greatest Effect it hath on them, is in lessening their Growth, causing some (which while they continued in their original plain Colours, did rise near three Feet in Height), to advance little more than two Feet, after their Colours were alter'd; and the more beautifully their Stripes do appear, the shorter will be their Stems, and the weaker their Flowers.

There is nothing more to be observed in the Culture of strip'd Flowers, than what has been directed for Breeders, excepting that these should be arch'd over with tall Hoops and Rails, that they may be shaded from the Sun in the Day-time, and protected from strong Winds, hard Rains, and frosty Mornings, otherwise the Flowers will continue but a short time in Beauty; but where these Instructions are duly follow'd, they may be preserv'd in Flower a full Month, which is as long as most other Flowers do continue.

There are some Persons who are so extremely fond of these Flowers, as to have large Frames of Iron-work, to cover their Beds of *Tulips*, in such a manner, that they may walk between two Beds under the Frames, over which is spread Tarpawlines, so as to keep off Sun, Rain, and Frost; whereby they can view the Flowers without being at the Trouble of taking off or turning up the Tarpawlines, or being incommoded by the Sun or Rain, which cannot be avoided, where the Covering is low: Besides, by thus raising the Covers, the Flowers have a greater Share of Air, so that they are not drawn so weak as they are when the Covering is low and close to them; but these Frames being expensive, can only be purchased by Persons of Fortune; however, there may be Frames of Wood contrived

trived for a small Expence, which being arch'd over with Hoops, may answer the Purpose as well as the Iron Frames, tho' they are not so lightly or lasting.

But after their Flowers are faded, their Heads should be broken off, to prevent their seeding; for if this is not observ'd, they will not flower near so well the following Year, and this will cause their Stems to decay sooner than otherwise they would do, so that their Roots may be taken up early in June; for they should not remain in the Ground long after their Leaves are decay'd. In taking these Roots out of the Ground, you must be very careful not to bruise or cut 'em, which will endanger their rotting; and, if possible, it should be done a day or two after Rain. These Roots must be clear'd from their old Covers, and all Sorts of Filth, and spread upon Mats in a shady Place to dry, after which they should be put up in a dry Place, where Vermin can't get to 'em, observing to keep every Sort separated, but they should not be kept too close from the Air, nor suffer'd to lie in Heaps together, lest they should grow mouldy, after which they commonly rot when they are planted again.

The Off-sets of these Roots, which are not large enough to produce Flowers the succeeding Year, should be also put by themselves, keeping each Sort distinct; these should be planted about a Month earlier in Autumn than the blowing Roots, in particular Beds in the Flower-Nursery, where they may not be exposed to publick View: But the Earth of the Beds should be prepared for 'em in the same manner as for larger Roots, tho' these must not be planted above five Inches deep, and may be plac'd much nearer together than those which are to flower, and in one Year most of them will become strong enough to flower, when they may be remov'd into the Flower-Garden, and placed in the Beds amongst those of the same Kinds.

TULIPIFERA, [of *Tulipa*, a Tulip, and *fero*, Lat. to bear.] The Tulip-tree.

The Characters are;

The Flower consists of several Leaves, which expand in such a manner, as (by some thought), to resemble a Tulip; the Pointal rises in the Center of the Flower, surrounded by a great Number of Chives, and afterwards becomes a squamous Fruit, or Cone growing erect. To these Marks may be added, The Leaves, for the most part, being angular, the upper Part is hollowed as if cut off with Scissars, terminating in two Points.

The Species are;

1. **TULIPIFERA**; *arbor Virginiana*. H. L. The Virginian Tulip-tree.

2. **TULIPIFERA**; *Virginiana, laurinis foliis, aversâ parte rorâ caruleo tinâlis Conibaccifera*. Pluk. Phyt. The Laurel-leav'd Tulip-tree, vulgô.

The first Sort is very common in America, where it grows to a great Magnitude, but in England there are at present but very few of

them which have arriv'd to any considerable Stature. This Sort was formerly kept in Pots and Tubs, and housed in Winter with great Care, in which Management the Plants made but poor Progress, nor would ever have produced Flowers. But about fifty Years ago there was one of these Trees planted out in a Wilderness in the Gardens of the Right Honourable the Earl of Peterborough, at *Parsons-Green* near *Fulham*, which soon convinc'd the Curious of their Mistake in the Culture of this Tree, by the great Progress it made, and in a few Years after, it produced Flowers. This Tree is yet standing, and annually produces a great Quantity of Flowers, tho' some of the Branches begin to decay, which perhaps may have been occasioned by its being too closely surrounded with other Trees, whose Roots are so much entangled with those of this Tree, that they draw the Nourishment of the Ground from it. In some Years this Tree produces Cones, but they have not ever been perfected so as to contain good Seeds.

There are some other Trees of this Kind which have produced Flowers several Years, though I believe none of them are very large; the biggest I have seen (excepting that at *Parsons-Green*) is not more than twenty-five Feet high; whereas my Lord Peterborough's is upwards of fifty Feet high, and is proportionably large in the Trunk; but this has a naked Body near forty Feet high, all the Branches growing near the Top of the Tree, which might be occasion'd by being so closely surrounded with other Trees; for I have observed, where-ever they have a more open Situation, they are subject to extend their Branches, and do not aspire upwards very much, though they generally have one upright Shoot in the Middle, much after the manner of the Plane-tree, whose manner of Growth is very like that of this Tree.

The Flowers which these Trees produce, are by no means like those of the Tulip, though many Persons have been so incurious as to imagine them so, especially the Inhabitants of America, who first gave the Name of *Tulip-tree* unto this Plant, by which Name it has been since call'd by the Inhabitants of Europe, who received it from them with the Plants, many Years since; but I have not heard that any of these Trees have flowered in any Part of Europe, except in England.

Mr. Catesby, in his *Natural History of Carolina, &c.* says, There are some of these Trees in America, which are thirty Feet in Circumference, that the Boughs are very unequal and irregular, making several Bends or Elbows, which makes the Trees distinguishable at a great Distance, even when they have no Leaves upon them. They are found in most Parts of the Northern Continent of America, from the Cape of Florida to New-England, where the Timber is of great Use.

This Tree may be propagated from Seeds, which are often brought from America in the Cones; these should be taken out in the Spring, and

and sown in Pots or Boxes fill'd with light, fresh Earth, and placed upon a moderate Hot-bed, which should be covered only with Mats, and not have Glasses over 'em, because the Glasses will cause the Earth to dry too fast, and thereby spoil the Seeds.

These Pots should be frequently refresh'd with Water, and when the Plants are come up, they should be plac'd in a shady Situation during the *Summer* Season, but in *Winter* they must be put into a Frame, where they may enjoy the open Air in mild Weather, but must be shelter'd from Frost.

In the following *Spring* the Plants should be taken up, and each planted in a separate small Pot, fill'd with light, fresh Earth, and if these Pots are plunged into a moderate Hot-bed, under Mats, it will promote their Rooting; in *Summer* these Plants must be remov'd into the Shade, and in *Winter* into a Frame as before: After this manner they may be treated three or four Years, until they have acquired Strength, when they may be turn'd out of the Pots in the *Spring*, and planted where they are to remain, which should always be near the Shelter of other Trees, where they will grow much better than in an open Situation, provided they are not too much crowded or overhung by large Trees.

There are some People who propagate this Tree by Layers, but they are commonly two or three Years before they take Root, and these do seldom make so strait Trees as those rais'd from Seeds, though indeed they will produce Flowers sooner, as is always the Case with stunted Plants.

This Tree should be planted on a light loamy Soil, not too dry, on which it will thrive much better than upon a strong Clay, or a dry gravelly Ground; for in *America* they are chiefly found upon a moist deep Soil, where they will grow to a prodigious Size. Though it will not be proper to plant these Trees in a Soil which is too moist in *England*, because it might endanger the rotting of the Fibres of the Roots, by the Moisture continuing too long about them, especially if the Bottom be a Clay or a strong Loam, which will detain the Wet.

The *Laurel-leav'd Tulip-tree* is at present very rare in *England*, though formerly there were several of these Trees in the Gardens of the Bishop of London at Fulham, and those of the Dutchess of Beaufort at Chelsea; but these have been since lost, so that there are very few of them to be seen in the *English* Gardens. The largest Tree of this Kind, which I know at present, is in the Gardens of Mr. Peter Collinson at Peckham, which has produced a great Number of Flowers the three Years past. This Sort is propagated by Layers, for the Seeds do never come up if sown in *England*; the Layers should remain undisturb'd two Years, by which time they will take Root, and may then be taken off in the *Spring*, and planted in Pots fill'd with fresh, light Earth, and plac'd upon a moderate Hot-bed, to promote their taking Root; after

which they should stand in a shady Situation during the Heat of *Summer*, but in *Winter* they should be shelter'd from the Frost, especially while young, though when they have acquired Strength, they may be planted out in a warm Situation, where they may be shelter'd by other Trees, in which Places, with a little Care, they will endure the Cold of our *Winters* very well, and in a few Years will produce Flowers.

Though I have insert'd this Tree under this Title (which is the Name by which it was first brought into *England*), yet it does not strictly belong to this Place, there being a *Genus* under which this Plant should be ranged, which was establish'd by *Pere Plumier*, by the Name of *Magnolia*, in Honour to the learned Botanist *Peter Magnol*, Professor of Physick and Botany in the University of *Montpelier*. This Plant is curiously figur'd in the third Part of Mr. *Catesby's Natural History of Carolina*, by the Name of *Magnolia lauri folio subtus albicante*; he describes it to be a small Tree, seldom growing more than sixteen Feet high, that the Wood is white and spongy, cover'd over with a white Bark; the Leaves are in Shape like those of the common *Bay*, of a pale green Colour, and white on their Backsides. In *May* they begin to produce their Flowers, which are white, and very fragrant; these are continued the most part of *Summer*, during which Time the Woods are perfum'd with their Odour. When the Petals of these Flowers are decay'd, the Pointal becomes a conical Fruit, about the Size of a large Walnut, thick set with Knobs or Risings from each of which when the Fruit is ripe, is discharged flat Seeds, of the Bigness of *French Beans*, having a Kernel within a thin Shell, cover'd with a red Skin. These red Seeds, when discharged from their Cells, fall not to the Ground, but are supported by small white Threads, of about two Inches in length, which makes a very beautiful Appearance. The Fruit is at first green; when ripe, red; and when declining, turns brown: The Tree grows naturally in moist Places, and often in shallow Water; and what is very extraordinary, they being remov'd on high dry Ground, become more regular and handsome, and are more prolific of Flowers and Fruit. They usually lose their Leaves in *Winter*, unless it be moderate. It is call'd by some *The Sweet Bay*.

There is also another *Species* of this Tree, which hath been lately brought into *England*, which is called by *Pere Plumier*, *Magnolia amplissimo flore albo, fructu caruleo*. This is esteem'd one of the most beautiful Trees in *America*, where they usually grow in moist swampy Woods, and do often rise to the Height of sixty Feet, or more; the Leaves are much larger than those of our common *Laurel*, and are of a light-green Colour; the Flowers, I am told, are very large, of a whitish Colour, and very fragrant. The Fruit is shap'd like that of the former Sort, but is much larger, and does emit the Seeds in like manner; so that it is in Beauty from *May* to *November*,
and

and the Leaves always remaining green, do afford an elegant Prospect in Winter. They are of quick Growth, and generally rise with strait Stems, which is a great Addition to their Beauty; and since they are hardy enough to endure the Cold of our Climate in the open Ground, I doubt not but in a few Years we shall have the Pleasure of seeing its beautiful Flowers, there being several Trees planted in the Gardens of some curious Persons near London, where they have borne the Cold of the three last Winters without Shelter, and do make considerable Progress every Year.

This Tree is quick of Growth; for his Excellency Colonel Johnson, the present Governor of South Carolina, told me, he had taken many small Plants out of the Woods, and planted them near his Habitation, which Trees in three or four Years were grown near twenty Feet high; and since those which have been planted in the open Air, in several curious Gardens near London, have made so great Progress, it is to be hop'd, that this Tree will become more frequent in England: For these beautiful Trees, which retain their Verdure throughout the Year, will be very ornamental in Wilderness Quarters, where being intermix'd with other Trees of the same Growth, they will add to the Variety; and when they do come to Maturity, so as to produce Flowers, and Fruit in this Country, there are not any of the Flowering Trees yet known, that will afford a greater Pleasure than these; which should excite a Curiosity in such People who have Opportunities of procuring some of these Plants from Carolina, to bring over as many as they can, since the great Variety of Places they are planted in, the more Chances there are of their succeeding; and when the Nature of the Plants are better known in England, they may be propagated in greater Plenty than at present.

This Tree must also be obtain'd in Plants from Abroad, and increas'd by Layers as the former, for the Seeds have not succeeded in any Part of Europe, where they have yet been sown; and in the Woods of America, where they naturally grow, it is very difficult to find young Plants, the Cattle being so fond of 'em, that they generally eat off their Tops soon after they appear above-ground; but in little Islands which are surrounded by Rivulets, so that the Cattle can't easily get in, there are great Numbers of these Plants; therefore whoever would procure a Quantity of them, must always have Recourse to such Places as are unfrequented by Cattle.

TURKS CAP; *vide* Liliū flore reflexo.

TURKEY WHEAT; *vide* Mays.

TURNIP; *vide* Rapa.

TURNSOLE; *vide* Heliotropium.

TURRITIS: Tower-Mustard.

The Characters are;
The Flower consists of four Leaves, which

expand in Form of a Cross, out of whose Em-palement rises the Pointal, which afterwards becomes a long smooth Pod, which grows for the most part upright, and opens into two Parts, in each of which are contain'd many smooth Seeds.

The Species are;

1. **TURRITIS**; *vulgator*. J. B. Common Tower-Mustard.

2. **TURRITIS**; *foliis inferioribus Cicboraceis, cæteris persiliata*. Tourn. Tower-Mustard, with its under Leaves like those of Cichory, and the upper Leaves like Thorough-wax.

3. **TURRITIS**; *muralis minor*. Pet. H. B. Wall-Cress, or Tower-Mustard with Daisie Leaves.

4. **TURRITIS**; *Leucotifolio*. Tourn. Tower-Mustard with a Stock-gilliflower Leaf.

There are several other Species of this Plant, which are preserv'd in curious Botanick Gardens for the Sake of Variety, but as they have little Beauty or Usefulness, so they are seldom cultivated in other Gardens. The three first Sorts do grow wild upon Walls and Buildings in divers Parts of England, but the fourth Sort has not been discover'd to grow in this Country, except in Gardens.

They may all be cultivated by sowing their Seeds upon a Bed of light dry Earth in the Spring, and when the Plants are come up, they should be transplanted where they are to remain for good, observing to water 'em until they have taken Root, after which they will require no farther Care, but to clear 'em from Weeds, and the second Year they will produce Seeds, after which the Plants never do continue.

TUSSILAGO: Coltsfoot.

The Characters are;

It hath a radiated Flower, whose Disk consists of many Florets, but the Crown is compos'd of many half Florets; the Embryo's are included in a multiseid Flower-cup; which are afterwards turn'd to downy Seeds, fix'd in a Bed. To which Notes may be added, The Flowers appearing before the Leaves, in Spring.

The Species are;

1. **TUSSILAGO**; *vulgaris*. C. B. P. Common Coltsfoot.

2. **TUSSILAGO**; *Alpina, rotundifolia, glabra*. C. B. P. Round-leav'd smooth Coltsfoot of the Alps.

The first of these Sorts is very common in watery Places in almost every Part of England, and is rarely kept in Gardens; for the Roots do creep under-ground, and increase so fast, that in a short time they will spread over a large Spot of Ground.

The second Sort grows wild upon the Alps, from whence it has been transplanted into some curious Botanick Gardens for the Sake of Variety; the Flowers of this are purple, and those of the common Sort are yellow.

V A

VACCARIA; vide *Lychnis*.

VACCINIA; vide *Vitis Idea*.

VALERIANA, [so call'd of *valere*, Lat. to avail, because of its great Virtues, or of *Valerius*, who first made Use of this Plant in Physick. It is the true *Phu* of *Dioscorides*, or of the Antients; in Greek *ϕύλον* of *φύλον*, to be born, or *Phu* of *Phy*, a Pontic Word; which last denotes the penetrating Odour of this Root.] *Valerian*.

The Characters are;

The Leaves grow by Pairs, opposite upon the Stalks; the Flower consists of one Leaf, is tubulose, and divided into five Segments at the Top: These Flowers are, for the most part, collected into a sort of Umbel upon the Top of the Stalks, and are succeeded by oblong flat Seeds, which are winged with a soft Down.

The Species are;

1. **VALERIANA**; *bortenfis*, *Phu olusatrici folio*, *Dioscoridis*. C. B. P. Great Garden *Valerian*, or *Phu*.

2. **VALERIANA**; *sylvestris*, *magna*, *aquatica*. J. B. Great wild Water *Valerian*.

3. **VALERIANA**; *major*, *sylvestris*, *montana*. C. B. P. Great wild Mountain *Valerian*.

4. **VALERIANA**; *palustris*, *minor*. C. B. P. Small Marsh *Valerian*.

5. **VALERIANA**; *rubra*. C. B. P. Red Garden *Valerian*.

6. **VALERIANA**; *rubra*, *angustifolia*. C. B. P. Narrow-leav'd red Garden *Valerian*.

7. **VALERIANA**; *marina*, *latifolia*, *major*, *alba*. Mor. Umb. Great broad-leav'd white Sea *Valerian*.

The first of these Sorts is propagated in England for medicinal Use, and is called in the Shops by the Name of *Phu*, to distinguish it from the Mountain *Valerian*, which is preferred to all the other Sorts, by the modern Physicians, though the Roots of this first are still continued in some of the capital Medicines.

This Plant is propagated by parting of its Roots, either in *Spring* or *Autumn*, which should be planted in Beds of fresh dry Earth, about eight or ten Inches asunder, (for they commonly spread and multiply very fast); if the Season be dry, you must water the Plants until they have taken Root; after which they will require no farther Care, but to keep them clean from Weeds, and in *Autumn*, when their Leaves are decay'd, the Roots should be taken up and dry'd for Use.

The second Sort is very common in moist Places, and by the Sides of Rivers and Ditches in most Parts of England, but is rarely cultivated in Gardens. The Roots of this Kind,

being so common near London, are generally sold in the Markets instead of the third Sort, which is what should always be used, as being by far the strongest and most valuable.

The third Sort is generally found upon dry chalky Soils, in shady Places, in diverse Parts of England, the Roots of which are much preferable to those of the same Kind which are cultivated in Gardens; (as are all the Sorts of Aromatick Plants, when gather'd from their native Places of Growth).

This Plant may be propagated by parting the Roots either in *Spring* or *Autumn*, as was directed for the first Sort; but you should always observe to plant them upon a dry fresh undung'd Soil, in which, though the Roots will not make near so great Progress, as in a rich moist Soil, yet they will be much preferable to them for Use. These Roots should also be taken up, when the Leaves decay, in *Autumn*, and preserved dry until used.

The fourth Sort is very common in moist Soils, in divers Parts of England, but is seldom propagated in Gardens. This is placed among the Official Simples in the College Dispensatory, though it is rarely used in Medicine. It may be propagated in a moist Soil, by parting the Roots as the former.

The fifth, sixth, and seventh Sorts are propagated in Gardens for the Beauty of their Flowers, but they are only proper for large Gardens, being very apt to grow too large for small Places. These may be propagated by parting their Roots, in the manner before directed, or from Seeds, which should be sown in *Autumn*, soon after they are ripe, upon a Bed of light fresh Earth; and in the *Spring*, when the Plants come up, they should either be transplanted into Nursery-beds, or the Borders where they are to remain for good.

Some of these Plants will flower the first Season, but the second Year they will all flower very strong. They commonly grow about three Feet high, and when the Roots are strong, they will continue flowering most part of the *Summer*, which renders them worthy of a Place in large Borders, and also in Avenues and other abject Parts of the Garden, they being very hardy, and will grow in almost any Soil or Situation; but their Roots will abide longest in a dry barren Soil; for in rich moist Places they seldom continue more than two Years.

The Seeds of these Kinds will often get into the Joints of old Walls, where they will grow and abide many Years, without any Care or Culture, and produce Flowers most Part of the *Summer*; and in such a Situation they will endure all Weathers, without the least Injury. These Plants are never used in Medicine.

VALERIANA GRÆCA; vide *Polemonium*.

VALERIANELLA, [*q. d.* Small *Valerian*] Corn-fallet, or Lamb's-lettuce.

The Characters are;

The Leaves grow by Pairs opposite on the Branches, the Branches are always divided into two Parts, and appear at the Top like an Umbrello; the Flower consists of one Leaf, which is cut into many Segments, and is succeeded by one naked Seed, having no Down adhering to it, in which it differs from the Valerian.

The Species are;

1. VALERIANELLA; *arvensis, præcox, humilis, semine compresso.* Mor. Umb. Early low Corn-sallet with a flat Seed.

2. VALERIANELLA; *arvensis, præcox, humilis, foliis serratis.* Tourn. Early low Corn-sallet with serrated Leaves.

3. VALERIANELLA; *arvensis, serotina, altior, semine turgidiore.* Mor. Umb. Taller late Corn-sallet with a turgid Seed.

4. VALERIANELLA; *semine stellato.* C. B. P. Corn-sallet with a starry Seed.

5. VALERIANELLA; *cornucopoides, rubra vel Indica.* Mor. Umb. Red or Indian Corn-sallet resembling the Cornucopia.

The three first Sorts are found wild in several Parts of England. The third is often cultivated in Gardens, for Sallets in the Spring, though either of the three may be cultivated for the same Purpose, they being equally good. The Seeds of these Plants should be sown in Autumn, soon after they are ripe, for if they are kept till Spring, the Plants seldom come up the same Summer; the Seeds commonly remaining in the Ground, will come up the succeeding Spring, notwithstanding the Place be dug and sowed with other Seeds, as I have often observed.

These Plants will grow in almost any Soil or Situation, and require no farther Care but to keep 'em clear from Weeds, until they are fit for Use: They should always be cut while they are young, for if they are grown pretty large, they will become strong and bitter.

The fourth and fifth Sorts are preserved in Botanick Gardens for Variety, but are not of any Use. These may be propagated by sowing their Seeds in the Spring, upon a Bed of dry Earth, where they may remain to flower and seed.

These are all annual Plants, which must be sown every Year, or their Seeds permitted to scatter upon the Ground, where they will come up, and thrive without any other Culture, than only to clear 'em from Weeds.

VAPORIFEROUS, signifies, causing or producing Vapours.

VAPOUR, is by some defin'd to be a thin Vesicle of Water, or other humid Matter, fill'd or inflated with Air, which being rarefied to a certain Degree by the Action of Heat, ascends to a certain Height in the Atmosphere, where it is suspended till it returns in form of Rain, Snow, or the like.

Some use the Term Vapour indifferently for all Fumes emitted either from moist Bodies, as Fluids of any Kind; or from dry Bo-

dies, as Sulphur, &c. But Sir Isaac Newton and other Authors, better distinguish between humid and dry Fumes, calling the latter Exhalations.

VAPOURS, are defin'd by Naturalists to be those watry Particles which are severed from others by the Motion of the Air, and are carried about in it several Ways, according as the Wind, or Warmness of the Air serves: They rise out of the Sea, Rivers, Lakes, and other Waters.

As to their hanging in the Air, we may observe, in a hot Day, when there is no Wind stirring, such a Company of Vapours to rise out of moist Ground, as make thick Fogs, which are sometimes higher, and sometimes lower, as the Multitude and Motion of the Vapours happen to be. They are to be seen as well upon high Grounds as low.

They are easily dissipated by the Wind, and particularly if it be a drying Wind.

The Sun has the same Effect upon them; and we commonly see, when there are thick Fogs about Sun-rising, they disappear a little after it is up.

It is evident, that Fogs do consist of aqueous Particles rarefied, because they mightily bedew every thing that lies open to them. These Particles, being soundly moved, must needs fly aloft into the Air; but if their Motion be something faint, they play about the Surface of the Earth. For this is agreeable to the Laws of Motion, that such Things as are about the Globe of the Earth, the more they are moved, the more they recede from the Center of the Earth.

Again, these Fogs arise out of all Places, mountainous or champaign, and continue 'till they are dispell'd by Wind or Heat; but they continue longest in the lowest Grounds, because those Places are fullest of Moisture, and are not so much expos'd to the Winds: But wherever they be, when the Wind rises upon them, they are dissipated and driven about, 'till we see no more of them.

So, in like Manner, the Heat of the Sun, by putting them into a brisker Motion, either dissipates them by Rarefaction, or raises them higher, and forms them into Clouds.

And whereas sometimes the Fogs stink, it is not because they come from stinking Water, but because the Vapours are mix'd with sulphureous Exhalations, which smell so. Perhaps these Exhalations would fly up directly to the Clouds, if there were no Fogs to hold them, and so would not affect the Sense of Smelling; but when they are once entangled and blended with the Fog, they last as long as that does.

The Clouds are higher than the Fogs; they hang in the Air, and are carried about in it by the Winds. The Clouds are of various Figures, and sometimes so thin, that the Rays of the Sun pass through them; but at other times they are thick enough to intercept and obstruct them: They also appear of several Colours,

Colours, as, white, red, and sometimes very dark.

The Thickness of the Clouds proceeds from the Closeness of the vaporous Particles one to another; and their Thinness from the Distance of those Particles one from another, of which there are several Causes. When they are very thin, they leave so many Interstices, that the Rays of the Sun dart through them in many Places, but are intercepted in others.

As to the Varieties of the Figures of the Clouds, they arise from their Plenty of Vapours, and the Influence of the Sun and Wind: For they cannot be variously condens'd, rarefied, and carried about in the Air, but their Figure must needs be changed.

To account for the Clouds hanging in the Air, is a Matter of some Difficulty.

All the watry Particles, of which they consist, are heavier than Air; and so, if there were nothing to hinder them, they would fall to the Earth. But there are two Things that seem to keep them up.

1. The Winds which blow from all Parts, under the Region of the Clouds, and bear about with them many lighter Sorts of Bodies; especially if those Bodies contain but a small Quantity of solid Matter under a broad Superficies. And thus it is visible, how easy Paper-Kites are kept up by the Wind, when they are mounted pretty high; and so the Particles of Water, pretty much rarefied, may easily be suspended at that Height.

2. New Exhalations and Vapours are perpetually fuming out of the Earth, and by their moving upwards, prevent the Clouds from descending, unless the Density of the Clouds over-weigh them. Thus we see the Vapour of Fire carries lighter Bodies up the Chimney: And Smoke can turn a thin Plate of Iron, artfully placed in it, so strongly, as to turn about a Spit and roast Meat.

It is a Question among Naturalists, Whether Clouds and thicker Fogs are compos'd alike? Or whether there be something more in the Clouds?

Some think that Clouds are grosser than all Fogs; and that they are compos'd of Flakes of Snow, rather than Particles of Water, such as make Fogs.

Others say, it is enough to consider Clouds as a closer Sort of Fogs. And indeed the Fogs that hang upon the Tops of very high Hills, appear to People in the Plains, to be all one with Clouds; though those that are at them, perceive nothing but a thick Fog.

There being always many Vapours in the Air, though not always visible, it comes to pass, that great Dews fall even in clear Weather, and especially in those Countries where it seldom rains. For when it happens, that the scattered Vapours are collected and condensed together, and forced downwards, they must needs fall, and bedew Plants and Grass.

The Time for the falling of the Dew is either before the Rising of the Sun, or after the Setting of it. But in order to its falling regularly, at those Times it is necessary that the Air be calm; for windy or stormy Wea-

ther hinders it. But when the Weather is calm, and gentle Breezes are felt from the West about the Time that the Sun sets; and from the East about the Rising of it, it is probable they collect the Vapours, and precipitate them, by moderately cooling the Air. And because the Morning Breezes are more general than the Evening ones, therefore the Evening Dews fall only here and there; but the Morning ones seldom fail to be universal.

It is likewise found by Experience, That the Dews are more copious in hotter Countries than in cold; the Reason of which seems to be this: That the Heat of the Sun does, in the Day-time, raise abundance of Vapours out of the Water, which Vapours are so extremely rarefied by the same Heat, that they are dispers'd far and wide; but the Cool of the Night brings them together again, and condenses them to that Degree, that they fall to the Ground, but not in such large Drops as Rain does.

But in colder Countries, where there are frequent Rains, and the Vapours are less rarefied, most of them come down in Rain, and but a small Part turns to Dew.

A certain Author says, That in some of the hotter Climates, the Earth is without Rain for six or seven Months together, and is every Summer Season so much parch'd and dry'd, that there is hardly any Moisture to be found in it for three or four Feet deep, and during that Time, the Heats are so excessive, that without the refreshing Dews of the Nights (which are there very considerable) the Plants must inevitably perish; for there is no Moisture they can have, but from the Dews: And yet that Moisture supports the Trees and Plants in a flourishing State. Towards the End of the Day, the Leaves contract themselves, by Reason of the excessive Heat of the Sun; but by the falling of the Dews at Night, they expand and open themselves; so that in the Morning and Fore-part of the Day they have a most agreeable Verdure. And also this Moisture of the Dews affords sufficient Nourishment to the Plants to bring the Fruits to Perfection.

Dr. Desaguliers has presented us with the following Attempts, to solve the Phenomenon of Vapours, Formation of Clouds, and Descent of Rain.

He tells us, That though this has been a Subject so often treated of, none of the Accounts (that he has met with) seem to him to be sufficient to solve all the Circumstances of it.

That as to what Dr. Newentyt and some others have said, that Particles of Fire separated from the Sun-Beams, by adhering to Particles of Water, make up *Molecularæ* or small Bodies, specifically lighter than Air, which therefore by Hydrostatical Laws, must rise and form Clouds that remain suspended, when they are risen up to such an Height, that the Air about them is of the same specifick Gravity with themselves.

That

That Rain is produced by the Separation of the Particles of Fire from those of Water, which last being then restored to their former specifick Gravity, can be no longer sustained by the Air ; but must fall in Drops.

This, says Dr. *Desaguliers*, is liable to several Objections.

1. It is built upon a Supposition, that Fire is a particular Substance, or distinct Element, which has never yet been prov'd by convincing Experiments and sufficient Observations ; and which the Reverend Mr. *Hales* has shewn to be an ill-grounded Opinion, in his late Book of *Vegetable Staticks*, and has made it very plain, that those Bodies which had been thought to become heavier by Particles of Fire adhering to them, have, by chymical Operations, been prov'd to be only so by the Adhesion of Particles of Air, &c. which he has shewn to be *absorbed* in great Quantities, by some Bodies, whilst it is *generated* (or reduc'd from a fix'd to an elastick State) by others ; nay, that it may be *absorbed* and *generated* successively by the same Body under different Circumstances.

2dly, If the above-mentioned Supposition should be allow'd, the Difficulty will still remain about the Rain which is produc'd by the Fire's being separated from the Water : For Dr. *Niewentyt* ascribes this Effect to two different Causes.

First, to Condensation ; for he says ; " That " when contrary Winds blow against the same " Cloud, and drive the watry Particles together, the Fire that adher'd to them gets " loose, and they (becoming then specifically " heavier) precipitate and fall down in Rain." And in the very next *Section* he ascribes it to Rarefaction ; in that he says ; " When a " Wind blowing obliquely upwards, causes a " Cloud to rise in a thinner Air, (i. e. specifically lighter than it self) the Fire, which " by sticking to the Particles of Water render'd them lighter, extricates it self from " them, and ascending by its Lightness, the " Water will become too heavy, not only to " remain in this thin and light Air, but even " in a thicker and heavier near the Earth, " and so will be turned into a descending " Dew, Mist, or Rain, or Snow, or the like, " according as the watry Vapours are either " rarefied or compressed."

To this Dr. *Desaguliers* answers : That the first of these Causes of Rain is contrary to Experience ; for when two contrary Winds blow against each other, over any Place of the Earth, the Barometer always rises, and we have fair Weather. For then (as Dr. *Halley* says, in *Philosophical Transactions*, N^o 183.) the Air being accumulated above, becomes specifically heavier about the Clouds, which (instead of falling into Rain, as Dr. *Niewentyt* supposes) ascend up into such a Part of the Atmosphere, as has the Air of the same specifick Gravity with themselves.

If the falling of Rain might be attributed to the second of these Causes, then every Time a Cloud is encompassed with Air specifically lighter than it self, (whether it be when

by the blowing away some of the superior Air, that which is about the Cloud becomes rarer, as it is less compress'd, or by the Cloud being driven upwards ;) Rain must necessarily follow ; whereas one may often see Clouds rise and fall without Rain, even when the Barometer shews the Weight of the Air to be altered.

For that happens only, when by the great Diminution of the specifick Gravity of the Air about the Cloud, it has a great Way to fall ; in which Case the Resistance of the Air, which increases as the Velocity of the descending Cloud, causes the floating Particles of Water to come within the Power of each other's Attraction, and form such big Drops, as being specifically heavier than any Air, must fall in Rain.

No gentle Descent of a Cloud ; but only an accelerated Motion downwards, produces Rain.

He explains himself, that by this he does not mean, *That the quick Descent of a Cloud is the only Cause of Rain ; because the Shock from a Flash of Lightning, and the sudden Return of the Air, after the Vacuum made by the Flash, will condense the floating Vapour into Water ; and also the same Cloud which in the free Air might be carried horizontally, without being turned into Rain, meeting with a high Hill in the Way, will be condens'd, and fall in Drops ; especially if in the Day-time it be driven by the Wind out of the Sun-shine, against the shaded Side of a Mountain.*

Besides all this, if Particles of Fire were join'd with those of Water to raise them up, those igneous Particles must be at least a thousand times greater in Bulk than the watry ones ; so that a Person, who at the Top of an Hill, has his Hands and Face in a Cloud, must feel a very sensible Warmth, by touching a much greater Surface of Fire than Water in the Cloud, and afterwards find the Rain produc'd by that Vapour sensibly colder ; whereas the contrary is proved by our Senses ; the Tops of Hills, though in the Clouds, being much colder than the Rain at the Bottom.

There is another Opinion concerning the Rise of Vapours, namely ; That though Water be specifically heavier than Air, yet if its Surface be increas'd, by very much diminishing the Bulk of its Particles, when once rais'd, it cannot easily fall ; because the Weight of each Particle diminishes, as the Cube Root of its Diameter, and the Surface to which the Air resists, only as the Square Root of the Diameter : That we see this in the Dust in Summer, and in Menstruums that sustain Metals dissolv'd, which are specifically heavier than the Menstruums.

But this will not explain the Phenomenon ; because though the Increase of Surface (the Weight remaining the same) will, in a great measure, hinder (or rather retard) the Descent of small Bodies, moving in the Air, by reason of its great Resistance to so large a Surface ; it will for the same Reason also hinder the Ascent.

For

For the Rise of Dust is owing to the Motion of Animals Feet in it, or to the Wind; whereas *Vapours* rise in cold Weather, as well as windy; neither do they, like the Dust, always fall to the Ground, when the Wind ceases to blow.

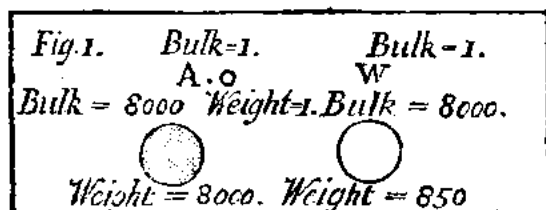
The third Opinion, and which is most commonly receiv'd, is, that by the Action of the Sun on the Water, small Particles thereof are formed into hollow Spherules, filled with an *Aura*, or finer Air highly rarefied, so as to become specifically lighter than common Air, and consequently that they must rise in it by Hydrostatical Laws.

As for Example: If a Particle of Water, as it becomes a hollow Sphere, be only increased ten times in Diameter, its Bulk will be increas'd a thousand times; therefore, it will be specifically lighter than common Water, whose specifick Gravity is to that of Air as 851 to 1; then, if the Density of the *Aura*, or Spirit within the little Shell, be supposed 9 times less than that of Air, or as 50 to 850, that specifick Gravity of the Shell, and its Contents, will be to that of Air, as 900 to 1000; therefore such an aqueous Bubble must rise till it come to an *Equilibrium* in Air, whose Density is to the Density of that in which it began to rise, as 850 to 945, or nearly.

But it appears by Experiments, that Air rarefied by an Heat, which makes a Retort red hot, is only increased in Bulk, or dilated 3 times: by the Heat of boiling Water only $\frac{1}{3}$, or near two Thirds; and by the Heat of human Body, (such as will raise *Vapours* plentifully) only $\frac{1}{3}$, or about one Fourth.

He owns his Objection may be answered, by supposing the Spherule of Water to be more increased in Diameter; as for Example, 20 times; because then if it be filled with Air only $\frac{1}{4}$ rather than common Air, it will be specifically lighter, and capable of rising to a considerable Height.

To give this Solution all its Force, let it be express'd in Numbers. Let A and W (Fig. 1.) represent a Particle of Air, and one of Water of equal Bulk, then will the Weight of A be to the Weight of W as 1 to 850, their Bulks being equal. If the Particle of



Water be blown up in a Bubble (W) of 20 times its Diameter, then will its Bulk be to its Weight as 1000, to 850, whilst a Sphere of Air (A) of the same Bigness, has its Weight as well as Bulk equal to 8000: Now, if an Air or *Aura*, $\frac{1}{4}$ rarer than common Air, be supposed within the watry Bubble to keep it blown, it will be the same as if $\frac{1}{4}$ of the Air of (A) was carried into (W) and then the Weight of (W) would be increas'd by the

Number 6000; so that the Shell of Water being in Bulk 8000, would be in Weight $850+6000=6850$, whilst an equal Bulk of Air weighed 8000, and consequently the watry Bubble would rise 'till it came to an Air, whose Density is to that of the Air, next to the Surface of the exhaling Water, as 6850, to 8000.

This is the strongest Way of stating the Hypothesis; but to support it, the following *Queries* must be answered.

Query 1. How comes the *Aura* or Air in the Bubbles to be specifically lighter than that without them, since the Sun's Rays, which act upon the Water, are equally dense all over its Surface?

Query 2. If it could be possible for a rarer Air to be separated from the denser ambient Air, to blow up the Bubbles (as Bubbles of soaped Water are blown up by warm Air from the Lungs, whilst the ambient Air is colder and denser) what would hinder that cold Air, by its greater Pressure, from reducing the Bubbles to a less Bulk, and greater specifick Gravity than the Air, especially since Cold can be communicated thro' such thin Shells, and the Tenacity of common Water is very small, when compared to that of soap'd Water, whose Bubbles, notwithstanding that Tenacity, are soon destroy'd by the Pressure of the outward Air, as the Air within them cools?

Query 3. If we should grant all the rest of the Supposition, yet this Difficulty will remain: If Clouds are made up of hollow Shells of Water filled with Air, why do not those Clouds always expand when the ambient Air is rarefied, and presses less than it did before, and also suffer a Condensation, as the ambient Air is condens'd by the Accumulation of the superior Air?

If this Condensation and Rarefaction should happen to Clouds, they would always continue at the same Height, contrary to Observation, and we should never have any Rain.

From all this it follows, that the Condensation and Rarefaction of the Vapours, which make Clouds, must depend upon another Principle, than the Condensation and Rarefaction of the Air; and that there is such a Principle will be hereafter shewn.

Lemma. The Particles of all Fluids have a repellent Force.

Fluids are elastick or unelastick: The elastick Fluids have their Density proportionable to their Compression, and Sir Isaac Newton has demonstrated (*Princip. Lib. 2. Sect. 5.*) that they consist of Parts that repel each other from their respective Centers.

Unelastick Fluids, like Mercury, Water, and other Liquors, are, by Experiments, found to be incompressible; for Water, in the *Florentine* Experiment, could not, by any Force, be compress'd into less Room, but ooz'd like Dew through the Pores of the hollow golden Ball, in which it was confin'd, when a Force was apply'd to press the Ball out of its spherical, into a less capacious Figure.

Now this Property of Water, and other Liquors, must be entirely owing to the centrifugal Force of its Parts, and not its want of Vacuity; since Salts may be imbib'd by Water without increasing its Bulk, as appears by the Increase of its specifick Gravity.

So Metals, which (singly) have a certain specifick Gravity, beyond which they cannot be condens'd, will yet receive each other in their Interstices, so as to make a Compound specifically heavier than the most ponderous of them; as is experienc'd in the Mixture of Copper and Tin.

Scholium. By increasing the repellent Force of the Particles, an unelastick or incompressible Fluid, may become elastick; or a solid (at least a great Part of it) may be changed into an elastick Fluid; and *vice versa*, by diminishing the repellent Force, an elastick Fluid may be reduc'd to an unelastick Fluid or to a Solid.

That the Particles of Quicksilver, Water, and other Liquors, are likewise endued with an attractive Force, is evident from those Substances running into Drops in an exhausted Receiver, as well as in the Air, and likewise their adhering to other Bodies.

The Attraction and Repulsion exert their Forces differently: The Attraction only acts upon the Particles which are in Contact, or very near it; in which Case it overcomes the Repulsion so far, as to render that Fluid unelastick, which otherwise would be so; but it does not wholly destroy the Repulsion of the Parts of the Fluid; because it is on account of that Repulsion that the Fluid is then incompressible.

When by Heat or Fermentation (or any other Cause, if there be any) the Particles are separated from the Contact, the Repulsion grows stronger, and the Particles exert that Force at great Distances, so that the same Body shall be expanded into a very large Space by becoming fluid, and may sometimes take up more Room than it did in a solid or incompressible Fluid. (See the *Queries* at the End of Sir Isaac Newton's *Opticks*.) Thus is Water by boiling and less Degrees of Heat, changed into an elastick Vapour, rare enough to rise in Air, Oils and Quicksilver in Distillation, made to rise in a very rare Medium; such as remains in the red-hot Retort and sulphureous Steams will rise even in an exhausted Receiver, as the Matter of the *Aurora Borealis* does in the thinner Part of our Atmosphere.

If *Aqua-fortis* be poured on Quicksilver, a reddish Fume will rise, much lighter than common Air: So also will Fumes arise from Filings of Metals, from Vegetables, when they ferment by Putrefaction (as the Reverend Mr. *Hales* has shewn); several solid Substances, by Distilling as well as Fermentation will generate permanent Air.

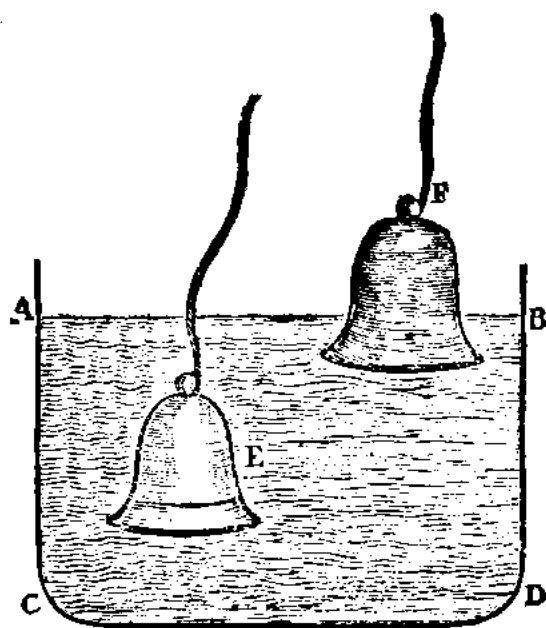
That Heat will add Elasticity to Fluids is evident, from numberless Experiments, especially from Distilling and Chymistry: But what is needful to be considered here, is only that it acts more powerfully on Water than

common Air; for the same Heat which rarefies the Air only $\frac{1}{3}$, will rarefy Water very near 14000 times, changing it into Steam or Vapour as it boils; and in Winter, that small Degree of Heat, which, in respect to our Bodies appears cold, will raise a Steam or Vapour from Water at the same time that it condenses Air.

By a great many Observations made by Mr. *Henry Beighton*, F. R. S. and Dr. *J. T. Desaguliers*, to raise Water by Fire; according to Mr. *Newcomen's* Improvement of it, they found that the Water, by boiling, was expanded 14000 times, to generate Steam as strong (*i. e.* as elastick) as common Air, which therefore must be near $16\frac{1}{2}$ times specifically lighter.

And it is plain that this Steam is not made of the Air extricated out of the Water, because it is condensed again into Water by a Jet of cold Water spouting into it; and the little Quantity of Air that comes out of the injected Water must be discharg'd at every Stroke, otherwise the Engine will not work well.

EXPERIMENT.



A B C D represents a pretty large Vessel of Water, which must be set on the Fire to boil. In this Vessel must be suspended the Glass Bell E, made heavy enough to sink in Water; but put in, in such a manner, that it be filled with Water when upright, without any Bubbles of Air at its Crown within, the Crown being all under Water.

As the Water boils, the Bell will by Degrees be emptied of its Water, being press'd down by the Steam which rises above the Water in the Bell; but as that Steam has the Appearance of Air, in order to know whether it be Air or not, take the Vessel off the Fire, and draw up the Bell by a String fastened to its Knob at Top; then as the Steam condenses by the cold Air on the Outside of the Bell, the Water will rise up into the Bell at F, quite to the Top, without any Bubble above

above it, which shews that the Steam that kept out the Water was not Air.

N. B. *This Experiment succeeds best when the Water has been first purged of Air by boiling, and the Air-Pump.*

We know by several Experiments made on the Fire-Engine, (in Captain Savory's Way, where the Steam is made to prefs immediately on the Water) that Steam will drive away Air, and that in proportion to its Heat; tho' in the open Air, it floats, and rises in it like Smoak.

Now if the Particles of Water turn'd into Steam or Vapour, repel each other strongly, and repel Air more than they repel each other, Aggregates of such Particles made up of Vapour and Vacuity, may rise in Air of different Densities, according to their own Density dependant on their Degree of Heat, without having Recourse to imaginary Bubbles, form'd in a manner only suppos'd, and not prov'd; as has been already shewn.

Indeed he owns, that if the watery Particles had no repellent Force, they must precipitate in the same manner that Dust will do after it has been rais'd up: But there are too many Observations and Experiments, to leave any Doubt of the Existence of repellent Force above-mentioned.

And that he cannot shew, by any Experiment, how big the Molecule of Vapour must be which will exclude Air from their Interstices; nor that these Molecule do vary in Proportion to the Degree of Heat by an Increase of repellent Force in each watery Particle; or by a farther Division of the Particles still less: But in the general, we may reasonable affirm, that the Rarity of the Vapour is proportionable to the Degree of its Heat, as it happens in other Fluids: (See Philosophical Transactions, Numb. 270.) And though the different Degrees of the Air's Rarefaction are also proportionable to the Heat, yet the same Degree of Heat rarefies Vapour much more than Air.

Now to shew that what has been said will account for the Rise of Vapours and Formation of Clouds, we must only consider, whether that Degree of Heat which is known to rarefy Water 14000 times, being compared with several of those Degrees of Heat in Summer, Autumn and Winter, which are capable of raising Exhalations from Water or Ice; the Rarity of the Vapours (being considered the Degree of Heat) will appear to be such, that the Vapour will rise high enough in Winter, and not too high in Summer, to agree with the known Phenomena.

That the Effects are adequate to the Causes in this Case, he thinks, may be made out in the following Manner; viz.

The Heat of boiling Water, according to Sir Isaac Newton's Table (*Philosoph. Transact.* Numb. 270.) is 34, the mean Heat of Summer 5, the mean Heat of Spring or Autumn 3, and the least Degree of Heat at which Vapours rise in Winter (*alias* the mean Heat of Winter) is 2.

The Rarity of Vapour proportionable to these 4 Degrees of Heat, is 14000, 2058, 1235, and 823.

The Rarity of Air is in Summer 900, in Spring or Autumn 850, and in Winter 800.

The Density of Water, compar'd with the above-mentioned Densities, being inversely as one to the fore-mentioned four Numbers.

The Heights above the Earth to which the Vapours will arise, and at which they will be in *Equilibrio*, in an Air of the same Density with themselves, will vary according to the Rarity of the Vapour depending upon the Heat of the Season.

For the Vapour which is rais'd by the Winter's Heat express'd by the Number 2, when the Rarity of the Air is 800, will rise to (and settle at) an Height of about the sixth Part of a Mile, when the Barometer is above 30 Inches high.

But if the Heat be greater, then the Vapours will rise higher, and pretty much higher if the Sun shines, tho' in frosty Weather, the Barometer then being very high.

If the Barometer falls, and thereby brings the Place of *Equilibrium* (for Vapours rais'd by the Heat 2) nearer the Earth, then also will the Heat be increas'd, the Vapour more rarefied, and consequently the new Place of *Equilibrium* sufficiently high.

It is to be observ'd that, in Winter, when the Heat is only equal to 2, the Air is dens'd close to the Earth, which has not any Heat sufficient to rarefy it near the Ground, as happens in warm Weather; therefore the Vapour will rise gradually in an Air whose Density decreases continually from the Earth upwards; neither will the Vapour be hinder'd of its full Rise by any Condensation from a greater Cold of the ambient Air, the Air being then as cold next to the Ground, where the Vapour begins to rise, as it is at any Height from the Earth.

The Vapour which is rais'd by the Heat of the Spring or Autumn, express'd by Number 3, will rise to the Height of $3\frac{1}{2}$ Miles when the Barometer is at 30, and the Air's Rarity is 850. But then as the Air is hotter near the Ground than at the Height of half a Mile or a Mile, the Vapour will condense as it rises; and as the Air, when the Earth is heated, is rather near the Ground than at some Height from it, the Place for *Equilibrium* will, upon these two Accounts, be brought much lower than otherwise it would be: As for Example, To the Height of about a Mile, which will agree with Phenomena.

In Summer, the two Causes above-mention'd increasing, the Vapour rais'd by the Heat 5, (whose Place of *Equilibrium* would be $5\frac{1}{2}$ Miles high, if the Vapour, after it began to rise, was not condens'd by cooling, and the Air was dens'd close to the Earth) will settle at the Height of about $1\frac{1}{4}$ or 2 Miles, which is also agreeable to Phenomena.

Lastly, As the Density and Rarity of the Vapour is chiefly owing to its Degree of Heat, and, in a small measure, to the increas'd or diminish'd Pressure of the circumambient Air, when it is not confin'd; and the Density and

Rarity

Rarety of the Air is chiefly owing to the increas'd or diminish'd Pressure, by the Accumulation or Exhaustion of superior Air, whilst Heat and Cold alter its Density in much less Proportion: The Clouds made of the *Vapours* above-mentioned, instead of conforming themselves to the alter'd Density of the ambient Air, will rise when it is condens'd, and sink when it is rarefied; and also rise or sink, when the Pressure of the Air is not alter'd, and its Density very little chang'd, by their own Dilatation, owing to Heat or Cold: As may be often observ'd, by seeing them change their Height considerably, whilst the *Barometer* continues exactly at the same Degree, and the Liquor of the *Thermometer* rises or falls very little, and sometimes not at all.

As for the Manner how Clouds are chang'd into Rain, it has been hinted at the Beginning of this Article; but, for farther Satisfaction, let the Reader have Recourse to Dr. *Halley's* Account of it in the *Philosophical Transactions*, N^o 183, which Dr. *Defaguliers* says he has always found agreeable to the *Phænomena*.

He adds, That since he had, for Brevity sake, only mention'd at what Heights from the Surface of the Earth *Vapours* of different Densities will come to an *Æquilibrium*, without giving a Reason for settling the Place of *Æquilibrium*, at whose Heights he thought it proper here to give the Method by which they may be found; viz.

As the *Vapours* will settle and rise where the Air is of the same Density with themselves, it is only requir'd to find the Density of the Air at any Distance from the Earth at several Heights of the *Barometer*, which may be deduc'd from Dr. *Halley's* two Tables, *Philosophical Transaction* N^o. 386. (the first shewing the Altitudes to given Heights of the *Mercury*; and the second, the Heights of the *Mercury* again at given Altitudes) and knowing the Degree of Heat by the *Thermometer*, because the Density of the *Vapour* depends upon the Degree of Heat of the Season, provided that proper Allowances be made for the great Rarefaction of the Air near the Earth in hot and dry Weather, and the Condensation of the *Vapours* in their Rise, by reason of the Air being colder at a little Height above the Earth than just at the Surface of it.

The Quantity of *Vapour* rais'd from the Sea by the Warmth of the Sun is far greater than one would imagine. Dr. *Halley* has attempted to estimate it.

In an Experiment made with that View, and describ'd in the *Philosophical Transactions*, he found that a Quantity of Water no warmer than Air in Summer, lost in *Vapour*, in the Space of two Hours, no less than $\frac{1}{3}$ Part of an Inch in Depth: Now for $\frac{1}{3}$ in two Hours, taking for the easier Calculation, $\frac{1}{60}$ in the twelve Hours that the Sun is up each Day, it will raise $\frac{1}{60}$ of an Inch from the Surface of the Sea.

On this Supposition, every ten square Inches of the Surface of the Water yield in *Vapour per Diem* a Cubick Inch of Water of 4 Feet

square, a Gallon; a Mile square, 6914 Tuns: a square Degree suppos'd of 60 *English* Miles, will evaporate 33 Millions of Tuns; and if the *Mediterranean* Sea be estimated at 410 Degrees long, and four broad, Allowances being made for the Places where it is broader, by those where it is narrower, there will be 160 square Degrees at Sea; and consequently the whole *Mediterranean* must lose in *Vapour*, in a Summer's Day, at least 5280 Millions of Tuns.

In this Quantity of *Vapour*, tho' very great, are only the Remains of another Cause, which cannot be reduc'd to Rule; that is, the *Winds*, whereby the Surface of the Water is lick'd up, sometimes faster than it exhales by the Heat of the Sun; as it is well known to those who have consider'd those drying *Winds*.

For the Manner wherein *Vapours* are rais'd, see more in *Dew*, *Rain*, *Heat*, *Cold*, and *Barometer*.

For the Effect of *Vapours* in Formation of Springs, see *Springs*, &c.

VARIEGATED, signifies streak'd or diversify'd with several Colours. There are now a great Variety of Plants in the Gardens of the Curious, whose Leaves are *variegated* with Yellow or White. Those which are spotted with either of these Colours in the Middle of their Leaves, are call'd *Blotch'd* (in the Gardener's Term); but those whose Leaves are edg'd with these Colours, are call'd *Strip'd* Plants: Those Plants whose Leaves are blotch'd, are generally subject to become plain, when planted in a good Soil, or at least in the growing Season, will have but small Appearance of the two Colours; but those which have edg'd Leaves, do rarely become plain again, especially if the Edging is broad, and goes quite through the Leaves; though these do not appear so finely *variegated* in the growing Season, as they do the other Parts of the Year.

All the different Sorts of *Variegation* in Plants were at first accidental, being no more than a Distemper in the Plant; which being observ'd, has been cherish'd by impoverishing the Soil in which they grow, by which Method their Stripes are render'd more lasting and beautiful. But whatever some Persons have affirm'd of striping Plants by Art, I could never observe it done by any, unless in woody Shrubs and Trees; which may be *variegated* by putting in a Bud or Graft taken from a *variegated* Plant, where altho' the Buds should not grow, yet if they keep fresh but eight or ten Days, they will many times communicate their gilded *Miasma* to the Sap of the Trees into which they were budded; so that in a short time after, it has appear'd very visible in the next adjoining Leaves, and has been afterwards spread over the greatest Part of the Tree: But in such Plants which are herbaceous, where this Operation cannot be perform'd, there is no way yet ascertain'd whereby this Striping can be effected by Art.

In some Sorts of Plants this Distemper is often communicated to the Seeds; so that from those

those Seeds gather'd from *variegated* Plants, there will constantly be some *variegated* Plants produc'd; as in the *Strip'd-wing Pea*, the *Greater Maple*, &c. so that these may be constantly propagated that Way.

That this Striping proceeds from the Weakness of Plants is very evident, since it is always observ'd, that whenever Plants do alter thus in the Colour of their Leaves, they do not grow so large as before, nor are they so capable to endure the Cold; so that many Sorts of Plants which are hardy enough to endure the Cold of our Climate in the open Air, when in their natural Verdure, do require to be shelter'd in the Winter after they are become *variegated*, and are seldom of so long Continuance; which is a plain Proof that it is a Distemper in the Plants, since whenever they become vigorous, this Striping is either render'd less visible, or intirely thrown off; especially (as was before observ'd) if the Plants are only blotch'd; or if the Edging be of a yellow Colour, it is less apt to remain than when it is white; which is esteem'd the most beautiful Striping, and which (when once thoroughly establish'd) is hardly ever to be got out of the Plants again, so as to render the Leaves intirely green.

Nay, such is the Venom of this morbid Matter, that it not only tinges the Leaves, but also the Bark and Fruit of Trees are infected by it; as in the *Orange*, *Pear*, &c. whose Bark and Fruit are strip'd in the same manner as their Leaves.

The different Colours which appear in Flowers do also proceed from the same Cause, tho' it is generally in a less Degree in them than when the Leaves and Branches are infected: For the various Colours which we see in the same Flowers, are occasioned by the Separation of the nutritive Juice of Plants, or from the Alteration of their Parts, whereby the smaller Corpuscles, which are carry'd to the Surface of the Flower-leaves, are of different Forms, and do thereby reflect the Rays of Light in different Proportions. In order to understand this, it may not be improper to say something concerning the *Phænomenon* of Colours, as it hath been discover'd by the late excellent Philosopher Sir *Istac Newton*.

1. *Colour* may be consider'd two ways. (1.) As a Quality residing in the Body, that is said to be so and so colour'd, or which doth modify the Light after such and such a manner: Or, (2.) As more properly the Light it self, which being so modify'd, shines upon the Organ of Sight, and produces that Sensation we call *Colour*.

2. *Colour* is defin'd to be a Property inherent in Light, whereby, according to the different Sizes or Magnitudes of its Parts, it excites different Vibrations in the Fibres of the Optick Nerve; which being propagated to the *Sensorium*, affects the Mind with different Sensations.

3. Again: *Colour* may be defin'd a Sensation of the Soul, excited by the Application of Light to the *Retina* of the Eye; and different, as the Light differs in the Degree of its

Refrangibility, and the Magnitude of its component Parts.

4. According to the first Definition, Light is the *Subject* of Colour; according to the latter it is the *Agent*.

5. So then, *Light* sometimes signifies that Sensation occasion'd in the Mind by the View of luminous Bodies; sometimes that Property in those Bodies, whereby they are fitted to excite those Sensations in us.

6. Various are the Opinions of ancient and modern Authors, and of the several Sects of Philosophers, with regard to the Nature and Origin of the *Phænomenon Colour*.

7. The *Peripateticks* assert *Colours* to be real Qualities, and inherent in the colour'd Bodies, and suppose that *Light* doth only discover them, but not any way affect their Production.

8. *Plato* thought *Colour* to be a kind of Flame, consisting of most minute Particles, very congruous to the Pores of the Eye, and darted against it from the Object.

9. Some Moderns will have *Colour* to be a kind of Internal Light, of the more lucid Parts of the Object darken'd, and consequently alter'd by the various Mixtures of the less luminous Parts.

10. Others, as did some of the ancient Atomists, maintain *Colour* not to be a lucid Stream, but a corporeal Effluvium issuing out of the coloured Body.

11. Others account for all *Colours* out of the various Mixture of Light and Darkness: And the Chymists will have it sometimes arise from the Sulphur, and sometimes from the Salt, that is in Bodies; and some also from the third Hypostatick Principle, i. e. *Mercury*.

12. The most popular Opinion, is that of the Followers of *Aristotle*, who maintain, that *Colour* is a Property inherent in the coloured Body, and that it exists without any Dependence on Light.

13. The *Cartesians*, who make the Sensation of Light to be the Impulse made on the Eye by certain solid, but very minute Globules, easily permeating the Pores of the Air and Diaphonous Bodies: These derive *Colour* from the various Proportion of the direct Progress or Motion of these Globules, to their Circumrotation or Motion round their own Centres; by which Means they are qualify'd to strike the Optick Nerve, after distinct and divers Manners, and so do produce the Perception of various Colours.

14. They own, that as the coloured Body is not immediately apply'd to the Organ, to occasion the Sensation, and as no Body can affect the Sense but by immediate Contact, the coloured Body does not excite the Sensation of itself, or contribute any thing to it, otherwise than by moving some interpos'd Medium, and by that the Organ of Sight.

15. They add, That as it is found that Bodies do not affect the Sense in the Dark, and that Light only occasions the Sensation of Colour, by moving the Organ; and that coloured Bodies are no farther concern'd, than

in reflecting the Light in a certain Modification; the Difference in Colours, according to them, arises in a Difference in the Texture of their Parts, by which they are dispos'd to reflect the Light with this or that Modification.

16. Dr. Hook, in his *Micographia*, says, The Phantasm of Colours is caus'd by the Sensation of the oblique or uneven Pulse of Light, and that this is capable of no more Varieties than two, which arise from the two Sides of the oblique Pulse; so that there is in reality but two simple Colours, *Yellow* and *Blue*; from the Mixture of which, and a due Proportion of Black and White, (that is, Darkness and Light) all Colours may be produc'd.

17. But this Phænomenon of Nature, Colour, having long perplex'd Philosophers to account for the Discoveries relating thereto, the incomparable Sir *Isaac Newton* found, by two Experiments on Prisms, that there is a great Deformity in the Rays of Light, and that hereby the *Origin of Colours* may be unfolded: The Doctrine of Colours therefore, according to his Notion and Experiments, are contain'd in the following Propositions:

1. That *Light* consists of an infinite Number of Rays, right-lin'd and parallel; but of different Degrees of Refrangibility, when meeting with a different Medium.

2. Each Ray, according to its Degree of Refrangibility, when so refracted, appears to the Eye of a different Colour.

3. The least refrangible Rays appear of a deep *Scarlet* Colour; the most refrangible appear of a *Violet Blue*: The intermediate proceeding from *Scarlet* to *Yellowish*, then to *light Green*, and so to *Blue*.

4. The Colours arising from the different Degrees of Refrangibility of Light, are not only the more noted Colours of *Red*, *Yellow*, *Green*, *Blue*; but also all the intermediate Colours of *Red* to *Yellow*, of *Yellow* to *Green*, &c.

5. *Whiteness*, (such as the Sun's Light appears), containing all those Degrees of Refrangibility, is consequently made up of all the above-mention'd Colours.

6. *Simple* or *Homogeneous* Colours, are such as are produc'd by *Homogeneous* Lights or Rays, which have the same Degree of Refrangibility; and mix'd Colours are such as are produc'd by Rays of different Refrangibility.

7. Rays of the same Refrangibility produce the same Colour; which Colour is not alterable by repeated Refractions, but only made more strong or faint, as the Rays are united or scatter'd.

8. All Bodies appear of this or that Colour, according as their Surfaces are adapted to reflect only the Rays of such a Colour, or (at least) in more Plenty than the rest.

But to explain these Things farther:

It is found by Experience, that Rays or Beams of Light, are compos'd of Particles very heterogeneous or dissimilar to each other; *i. e.* some of them, as it is highly probable, are larger, and others less: For a Ray of

Light being receiv'd on a refracting Surface in a dark Place, is not wholly refracted, but split, as it were, and diffus'd into several little Rays, some of which are refracted to the extreme Points, and others to the intermediate Points; *i. e.* those Particles of the Light which are most minute, are diverted the most easily and most considerably of all others, by the Action of the refracting Surface, out of their rectilineal Course; and the rest, as each exceeds another in Magnitude, so it is turn'd out of its Right Line with more Difficulty, and less considerably.

Now each Ray of Light, as it differs from another in its Degree of Refrangibility, so likewise it differs from it in Colour: This is warranted by numerous Experiments.

Those Particles which are most refracted, are found to constitute a Ray of a *Violet* Colour; *i. e.* in all Probability, the most minute Particles of Light, thus separately impell'd, excite the shortest Vibration in the *Retina*, which are thence propagated by the solid Fibres of the Optick Nerves into the Brain, there to excite the Sensation of *Violet* Colour, as being the most dusky and languid of all Colours.

Again: Those Particles which are the least refracted, constitute a *Radiolus*, or little Ray, of a *Red* Colour; *i. e.* The largest Particles of Light excite the longest Vibrations in the *Retina*, so as to excite the Sensation of *Red* Colour, the brightest and most vivid of all Colours.

Authors distinguish three general Kinds of *Red*; one bordering on the *Blue*, as *Columbine* or *Dove* Colour, *Purple* and *Crimson*, &c. another bordering on *Yellow*, as *Flame* Colour, and *Orange*.

Between these Extremes is a Medium, which partakes neither of the one nor the other, and this is what we properly call *Red*.

Acids turn *Black*, *Violet*, and *Blue* into *Red*; and *Red* into *Yellow*; and *Yellow* into a very pale *Yellow*.

Alkali's change *Red* into *Violet*, or *Purple* and *Yellow* into *Feuilemort* or *Dead-leaf* Colour.

Terrestrial and *Sulphureous* Matters become *Red* by extreme Heat; and some at length *Black*, as we see in *Brick*, *Red Bole*, *Red Chalk*, *Slate*, *Pumice*, &c. which, when vitrify'd by a Burning-glass, become *Black*.

Lobsters become *Red* by a moderate Fire; and by a violent one, *Black*.

Mercury and *Sulphur* mix'd and heated over a moderate Fire, make a beautiful *Red* call'd *Artificial Cinnabar*.

An Acid Spirit, as *Lemon-Juice*, being poured on a *Blue* Solution of *Turnsole*, turns it into a beautiful *Red*; *Alkali* restores it to an original *Blue*; and filtrating the reddest Wine, takes from it its *Red* Colour.

Monf. de la Hire has observ'd, That a very Luminous Body, seen through a *Black* one, always appears *Red*; as the Sun appears, when shining through a black Cloud. He adds, That many other People who see all the other Colours

Colours perfectly well, yet have no Idea of *Red*, and only see it perfectly *Black*. But to proceed :

The other Particles being in like manner separated, according to their respective Magnitudes, into little Rays, excite the intermediate Vibrations, and by this means occasion the Sensations of the intermediate Colours ; much in the same manner as the several Vibrations of the Air, according to their respective Magnitudes, excite the Sensations of different Sounds.

We may add to this, That not only the more distinct and notable Colours of *Red*, *Yellow*, *Blue*, &c. do thus take their Rise from the different Magnitude and Refrangibility of the Rays ; but also the intermediate Degrees or Tints of the same Colour ; as of *Yellow* up to *Green*, of *Red* down to *Yellow*, &c.

Farther : The Colours of these little Rays, not being any adventitious Modification thereof, but connate, primitive and necessary Properties, as consisting, in all Probability, in the Magnitudes of their Parts, must be perpetual and immutable, *i. e.* cannot be changed by any future Refraction or Reflection, or any Modification whatsoever.

This is confirm'd by abundance of Experiments ; all Endeavours having been us'd, after separating a colour'd Ray from those of other Kinds, to change it into some other Colour by repeated Refractions ; but to no Effect.

Indeed, it is possible to effect apparent Transmutations of Colours, *viz.* where there is an Assemblage or Mixture of Rays of different Kinds ; the component Colours never appearing in their natural Hue in such Mixtures, but always allay'd and temper'd with each other : whence a middling Kind of Colour does result ; which may be separated into the component ones by Refraction ; and those, after Separation, being remix'd, return to their former Colour.

Hence the Transmutations of Colours, by mixing those of different Kinds, are not real, but mere Appearances or Deceptions of the Sight ; for the Rays being again sever'd, exhibit the same Colours as they did at first : Thus *Blue* and *Yellow* Powders being mix'd, appear *Green* to the naked Eye ; yet having pass'd any Alteration, when view'd through a Microscope, the *Blue* and *Yellow* Particles will appear distinct.

Hence two Kinds of Colours do arise ; the one *Original* and *Simple*, produc'd by homogeneous Light ; or by Rays that have the same Degree of Refrangibility, and the same Magnitude of their Parts ; such are *Red*, *Yellow*, *Green*, *Blue*, a *Violet-purple*, *Orange*, and *Indigo*, with all their intermediate Tints and Degradations.

The other Kind of Colours is *Secondary* or *Heterogeneous*, compounded of the Primary ones, or of a Mixture of Rays differently refrangible, &c.

There may also be *Secondary* Colours produced by Composition, like the Primary ones,

or those consisting of Homogeneous Light, as to the Species or Appearance of the Colour, but not as to the Permanency and Immutability of it.

Thus *Yellow* and *Blue* mix'd, make *Green* ; *Red* and *Yellow* being mix'd, make *Orange* ; *Orange* and *yellowish Green* mix'd, make *Yellow*.

And in the general, any two Colours being mix'd, which in the Series of those generated by the Prism are not too far apart, that Colour will result from this Mixture, which is found in the Mid-way between them in the said Series : but those will not do so that are situated at too great a Distance.

Indeed, the more any Colour is compounded, the less perfect and vivid it is ; they may be diluted and weaken'd, till they cease, by too much Composition. Also, Colours not like to any of those of Homogeneous Light, may be produc'd by Composition.

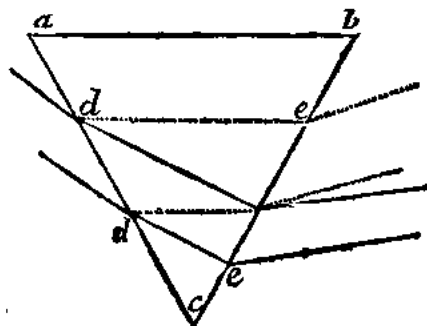
The most extraordinary Composition is that of *Whiteness* : for all the primary Colours above-mention'd, are required to this ; and those must be mix'd in a certain Degree. Hence it is that *White* is the ordinary Colour of Light ; Light being nothing else but a confus'd Assemblage of Rays of all Colours.

If the Rays of different Colours do thus begin to be separated by one Refraction of one single Substance ; that Separation is much promoted, so as even to become sensible to the Eye by a double Refraction.

This is observable in the two Surfaces of any Glass ; provided those Surfaces are not parallel : but of all others, it is most sensible in the two Faces of a triangular Prism ; the Phenomena whereof, as they are the Touch-stone of all Theories of Colours, and as they contain the Foundation of what is here deliver'd, I shall lay down as follows :

1. The Rays of the Sun transmitted through a triangular Prism, exhibit an Image of various Colours (the chief whereof are *Red*, *Yellow*, *Green*, *Blue*, and *Violet*) on the opposite Wall.

The Reason is, that the differently-colour'd Rays are separated by Refraction : For the *Blue* Rays, *v. g.* mark'd with the dotted Line, which begins to be separated from the rest



by the first Refraction *dd* (in the above Figure) of the Side *ca* of the Prism *abc*.

2. That Image is not round, but oblong ; its Length, when the Prism is an Angle of 60 or 65 Degrees, being 5 times its Breadth.

The

The Reason is, that some Rays are refracted more than others; and by that means exhibit several Images of the *Sun*, extended lengthwise, instead of one.

3. Those Rays which exhibit *Yellow*, are turned farther from the Rectilineal Course, than those which exhibit *Red*; those which exhibit *Green*, than those which exhibit *Yellow*: but of all others, those which exhibit the *Violet*, the most.

Accordingly, if the Prism through which the Light is transmitted be turn'd about its Axis, so as the *Red*, *Yellow*, *Green*, &c. Rays be projected in order through a narrow Aperture, into another Prism plac'd at the Distance of about twelve Feet; the *Yellow*, *Green*, &c. Rays, tho' falling through the same Aperture in the same Manner, and on the same Point of the second Prism, will not be refracted to the same Place as the *Red*, but to a Point at some Distance from it, on that Side to which the Rotation was made.

This is what Sir *Isaac Newton* calls *Experimentum Crucis*, being that which led him out of the Difficulties into which the first Phænomenon, &c. had brought him, and plainly shew'd a different Degree of Refrangibility, and a different Colour corresponding thereto in the Rays of Light; and that *Yellow* Rays, *v. g.* are more refracted than *Red* ones, and *Blue* and *Violet* most of all.

4. The Colours of coloured Rays, well separated by the Prism, are not at all changed or destroy'd by passing an illuminated Medium, nor by their mutual Decussation, their bordering on a deep Shadow, nor being reflected from any natural Body, or reflected through any one, in a Place how obscure soever.

The Reason is, that Colours are not Modifications arising from Refraction or Reflection, but immutable Properties, and such as belong to the Nature of the Rays.

5. An Assemblage of all Kinds of coloured Rays, collected either by several Prisms, by a Convex Lens, or a Concave Mirrour, or in any other Manner, from what we call *Whiteness*; yet each of these, after Decussation, becoming separated, again exhibits its proper Colour: For as the Ray was *white* before its Parts were separated, so the Parts being mix'd, it becomes *white* again; and colour'd Rays, when they meet together, don't destroy one another, but are only interspers'd.

Hence a *red*, *green*, *yellow*, *blue* and *violet* Colour, being mix'd in a certain Proportion, appear *whitish*, *i. e.* are of such a Colour as arises from *White* and *Black* mix'd together, and would be plainly *white*, if some Rays were not absorb'd and lost.

In like manner, if a Paper cut into a Circle be stained with each of those Colours separately, and in a certain Proportion, then swiftly turn'd round its Center, so as the Species of Colours be mix'd together in the Eye by the Briskness of the Motion, the several Colours will disappear, and the whole Paper appear of one continual Colour, which will be a Mean betwixt *White* and *Black*.

6. If the Rays of the Sun fall very obliquely on the inner Surface of a Prism, those that are reflected will be *Violet*, those transmitted *Red*.

For the Rays were colour'd before any Separation; and by how much the more they are refrangible, by so much they are the more easily reflected, and by that Means are separated.

7. If two hollow Prisms, the one fill'd with a *blue* Fluid, and the other with a *red* one, be join'd together, they will be opaque, tho' each apart be transparent.

For the one transmitting none but *blue* Rays, and the other none but *red* ones; the two together will transmit none at all.

8. All natural Bodies, especially *white* ones, view'd through a Prism held to the Eye, appear fimbriated or bordered on one Side with *Red* and *Yellow*, and on the other Side with *Blue* and *Violet*.

For those *Fimbriae* are the Extremes of intire Images, which the Rays of any kind, as they are more or less refracted, would exhibit nearer, or at a greater Distance from the real Place of the Object.

9. If two Prisms be so plac'd, as that the *Red* of the one, and the *Purple* of the other meet together, in a Paper fit for the Purpose, incompass'd with Darkness, the Image will appear pale; and if view'd through a third Prism, held to the Eye at a proper Distance, it will appear double, the one *Red*, the other *Purple*.

In like manner, if two Powders, the one perfectly *Red*, the other *Blue*, be mix'd, any little Body cover'd pretty deeply with this Mixture, and view'd thro' a Prism held to the Eye, will exhibit a double Image, the one *Red*, and the other *Blue*; in regard that the *Red* and *Purple*, or *Blue* Rays are separated by their unequal Refraction.

10. If the Rays transmitted thro' a Convex Lens, be receiv'd on a Paper, before they meet in a Focus, the Confines or Boundary of Light and Shadow, will appear ting'd with a *red* Colour; but if they be receiv'd beyond the Focus, with a *blue* one.

Because in the first Case, the *red* Rays being something more refracted, are the higher; but in the second, after Decussation in the Focus, the *blue* ones.

Lastly, if the Rays about to pass through either Side of the *Pupilla*, be not intercepted by the Interposition of any opaque Body near the Eye, the Extremes of Bodies, plac'd as if view'd through a Prism, will appear ting'd with Colours, tho' those are not very vivid.

For then the Rays transmitted through the rest of the Pupil will be separated by Refraction into Colours, without being diluted with the Admixture of the intercepted Rays, which would be refracted in a different manner.

And hence it is, that a Body view'd through a Paper pierced with two Holes, appears double, and also tinged with Colours.

[Of the COLOURS of thin Plates.] As Rays of different Colours are separated by the Refraction of Prisms, and other thick Bodies, so are they separated, tho' in a different manner,

in the thin *Lamellæ* or Plates of any pellucid Matter; v. g. the Bubbles rais'd in Water thickned by Soap, &c.

For all *Lamellæ* under a determined Thickness, in Arithmetical Proportion, begin to reflect first *Blue* Rays; then in order *Green*, *Yellow* and *Red*, all pure; then again *Blue*, *Green*, *Yellow*, and *Red*, all pure; then again *Blue*, *Green*, *Yellow* and *Red*, more and more mix'd and diluted; till at length arriving at a certain Thickness, they reflect Rays of all Colours perfectly intermix'd, viz. *White*.

But in whatsoever Part a slender *Lamella* reflects any one Colour, v. g. *Blue*, in that Part it always transmits the opposite Colour, v. g. *Red* or *Yellow*.

It is found by Experiment, that the Difference of Colour of a Plate, does not depend on the Medium that encompasses it; but the Degree of Vividness does, *ceteris paribus*, the Colour will be more vivid, if the denser Medium be incompass'd with the rarer: A Plate, *ceteris paribus*, reflects more Light, as it is thinner, as far as a certain Degree of Thinness, beyond which it reflects no Light at all.

In Plates whose Thickness increase in an Arithmetical Proportion of the natural Numbers, 1, 2, 3, 4, 5, &c. if the first or thinnest reflect any homogeneous Ray, the second will transmit it; the third again will reflect it; and thus is the same Ray alternately reflected and transmitted; i. e. the Plates corresponding to the odd Number 1, 3, 5, 7, &c. will reflect the same Rays that those corresponding to the even ones 2, 4, 6, 8, &c. transmit.

Hence an Homogeneous Colour in a Plate, is said to be of the *first Order*, if the Plate reflect all the Rays of that Colour: In a Plate whose Thinness is triple the first, it is said to be of the *second Order*: In another, whose Thinness is five times that of the first, it is said to be of the *third Order*, &c.

A Colour of the first Order is more vivid than any; and successively the Vividness of the Colour increases as the Quantity of the Order increases: The more the Thickness of the Plate is increas'd, the more Colours it reflects, and those of more different Orders: In some Plates the Colour will vary as the Position of the Eye varies; in others it is permanent.

COLOURS of *Natural Bodies*.] Bodies only appear of different Colours, as their Surfaces are dispos'd to reflect Rays of this or that Colour alone, or of this or that Colour more abundantly than the other: hence Bodies appear of that Colour that arises from the Mixture of the reflected Rays.

All *Natural Bodies* consist of very thin transparent *Lamellæ*; which, if they be so dispos'd with regard to each other, as that there happen no Reflections or Refractions in their Interstices, those Bodies become pellucid or transparent: but if their Intervals be so large, and those filled with such Matter, or so empty (and with regard to the Density of the Parts themselves) as that there happens a Number of Reflections and Refrac-

tions within the Body, the Body in that Case becomes opaque.

The Rays which are not reflected from an opaque Body, penetrate into it, and there suffering innumerable Reflections and Refractions, at length unite themselves to the Particles of the Bodies themselves.

Hence it is that an Opaque Body grows hot the sooner, as it reflects Light less copiously: hence we see, that a White Body, which reflects almost all the Rays that strike upon it, heats much more slowly than a Black one, which reflects scarce any.

In order to determine the Constitution of the Surface of Bodies wherein their Colour depends, it must be observed, That the smallest Corpuscles or Particles whereof Surfaces are made up, are most thin and transparent, and separated by a Medium of a different Density from the Particles themselves.

In the Surface then of every coloured Body are innumerable smaller thin Plates, answering to those of Bubbles.

Hence it may be gathered, that the Colour of a Body depends upon the Density and Thickness of the Parts of the Body between the Pores of the Surface; that the Colour is more vivid and homogeneous, as the Parts are thinner; that, *ceteris paribus*, the said Parts are the thickest when the Body is *Red*, and thinnest when *Violet*.

That the Parts of Bodies are usually much denser than the Medium contained in their Interstices; but that in the Tails of Peacocks, and some Silks, and generally in all Bodies, whose Colour varies according to the Situation of the Eye, it is less; and that the Colour of the Body is less vivid to the Eye, as it has a denser Medium within its Pores.

Now, of the several Opaque Bodies, those which consist of the thinnest *Lamellæ* are *Black*, those consisting either of the thickest *Lamellæ*, or of *Lamellæ* very different from each other in Thickness, and on that account fitted to reflect all Colours, as the Froth of Water, &c. are *White*.

Those again, which consist of *Lamellæ*, most of which are of some intermediate Thickness, are *Blue*, *Green*, *Yellow* or *Red*; inasmuch as they reflect the Rays of that particular Colour much more copiously than that of any other Colour; most of which last they either absorb and extinguish, by intercepting them, or else transmit.

Hence it is, that some Liquors, v. g. an Infusion of *Lignum Nephriticum*, appear *Red* or *Yellow*, if view'd by reflected Light, and *Blue* by transmitted Light; and Gold Leaves *Yellow* in the former Circumstances, but *Green* or *Blue* in the latter.

To this may be added, that some of the Powders used by Painters, have their Colours changed by being very finely ground; which must be occasioned by the Comminution or Breaking of their small Parts into others still smaller; just as a *Lamella* has its Colour alter'd, by altering its Thickness.

In fine; Those odd Phenomena arising from the Mixture of Liquors of different Colours,

Colours, can no way be better accounted for than from the various Actions of the saline, &c. Corpuscles of one Liquor, with the colour'd Corpuscles of another: If they unite, the Mass will either swell or sink, and thereby its Density will be alter'd. If they ferment, the Size of the Particles may be diminished, and thereby colour'd Liquors may become transparent: If they coagulate, an opaque Liquor may be produc'd of two transparent ones.

Hence it is easy to see, why a colour'd Liquor in a Glass of a conical Figure, plac'd between the Eye and the Light, appears of a different Colour in different Parts of the Vessel, there being more and more Rays intercepted, as they pass through a longer or shorter Section of the Vessel, till at the Base they are all intercepted, and none seen but those reflected.

From the various Colours of natural Bodies, Sir Isaac Newton observes, that the Bigness of their component Parts may be estimated, for that the Parts of Bodies do properly exhibit the same Colour with a Lamella of equal Thickness, provided the Density in both be the same.

Why the Colours of the Rainbow appear in falling Drops of Rain, is also from hence evident: For those Drops which refract the Rays, disposed to appear Purple in greatest Quantity to the Spectator's Eye, refract the Rays of other Sorts so much less, as to make them pass beside it; and such are the Drops of the Inside of the primary Bow, and on the Outside of the secondary or exterior one: So these Drops which refract in greatest Plenty the Rays apt to appear red to the Spectator's Eye, refract those of other Sorts so much more as to make them pass beside it; and such are the Drops on the exterior Part of the primary, and interior Part of the secondary Bow. See *Rainbow*.

It is very observable, that *White* is much brighter, as it is produc'd by a great Quantity of Rays; and the less Rays *Black* has, by so much the obscurer it is.

Red is the medium Colour between these two Extremes; because it contains as much Force of the one as the other: But *Yellow* contains more of the *White*, and *Blue* more of the *Black*.

Green is a Compound of *Yellow* and *Blue*; for if a Piece of blue Glass be laid upon a Piece of yellow Glass, and so placed between the Eye and the Object, whatsoever it is that is seen through them, will appear green.

But other Colours are not so inclineable to unite as *Blue* and *Yellow*; and for this a good Reason may be given, because the Parts of all other such like Mixtures are different in Proportion; and while there is any one Colour predominant, there can be no Union.

Father Niccron says, That *Red* is produc'd by an equal Interruption and Continuation of Rays; as if we suppos'd three continued Rays, and three Points of the Object which were dark: And this Supposition might give us to believe, that all Colours were compos'd of *White* and *Black*; that is to say, of certain Proportions of *Light* and *Darkness*: and nothing that is *Yellow* is equally distant from *White* and *Red*,

as *Blue* is from *Red* and *Black*. But the following Table may better explain the Difference of these.

<i>White</i> has 100 Rays of <i>Light</i> .	<i>Red</i> is compos'd of equal Parts of <i>White</i> and <i>Black</i> ; or of 50 Rays and 50 Points.	<i>Black</i> 100 Angles or Points of Darkness.
<i>Yellow</i> has 75 Rays, and 25 Points.	<i>Blue</i> has 75 Points, and 25 Rays.	
<i>Green</i> the Medium of <i>Blue</i> and <i>Yellow</i> .		

Sanctorius will have all Colours to proceed from *Shade* and *Temperancy*; and produces an Experiment to prove that *White* and *Black* are each of them compos'd of transparent Globes: and that those which give us the *White* are void and empty; and those which produce the *Black*, he thinks, are full of Matter.

The *White* containing only Air, gives no Shade; but the *Black* gives Shade; for Air, and such like subtil Bodies, make no Refraction.

Now, if we suppose all bright Colours to be compos'd of spherical Particles, then we may reasonably imagine, that the brightest Sorts of them do consist of smaller Globes than those do that are more faint; because, as *Sanctorius* says, we know that in all transparent Bodies in this Form, every single Globe will send at least one single Ray to the Eye; and by so many the more there are of those Rays, by so much the more such Colours come nearer to *Light* itself, which as these Parts are more subtil and refin'd, is the more dazzling.

And in like manner the darker Colours, by how much the more they are compos'd either of more triangular Parts, or as the Parts that compose them tend towards the last conceivable Point of Magnitude, by so much they become more sensibly obscure.

It may be farther observ'd, that *Heat* and *Cold* do necessarily result from *Light* and *Darkness*; the more moderate Points of which are *Yellow* and *Blue*, which together produce *Green*; and that seems to be the most prevailing Colour of the Earth.

It is also remarkable, that in the growing of Plants, the same Plants do, from time to time, alter and change their Colours, as the Vessels which are in those Shoots grow larger: The Leaves are of a faint *Yellow* when they are in their smaller State; but they become of a bright *Green*, or sometimes *Red*, when they are in their middle State; but when their Vessels are enlarged to their full Growth, they become of a dark *Green*, and then change to a *Feuilletmort* Colour towards *Autumn*, from the ripening of their Juices; from thence to Putrefaction, which resolves it self again into Earth, its first Principle.

VASCULIFEROUS PLANTS are such whose Seeds are contain'd in Vessels which are

are sometimes divided into Cells; and these have always a monopetalous Flower, either uniform or difform.

VASE is sometimes us'd for *Calix*.

VASES: A *Vase* is a Sort of a Flower-Pot to set in a Garden.

VEGETABLE, a Term apply'd to all Plants, consider'd as capable of Growth, *i. e.* to all natural Bodies which have Parts organically form'd for Generation and Accretion, but not for Sensation.

M. Boerhaave defines a *Vegetable* to be a Body generated of the Earth, to which it adheres, and is connected by Parts call'd Roots, through which it receives the Matter of its Nourishment and Increase, and consists of Juices and Vessels, sensibly distinct from each other: Or a *Vegetable* is an organical Body compos'd of Vessels and Juices, every where distinguishable from each other, to which Roots grow; or Parts, by which it adheres to some other Body, from which it derives the Matter of its Life and Growth.

This Definition of a *Vegetable* is very *scientific*, and furnishes us with a just and adequate Idea of it; for by its consisting of Vessels and Juices, it is distinguished from a *Fossil*; and by its adhering to another Body, and deriving its Nourishment therefrom, it is distinguish'd from an *Animal*.

He defines a *Vegetable* an *Organical Body*, because it consists of different Parts, which jointly concur to the Exercise of the same Function.

The Definition of its adhering by some of its Parts to another Body, is very proper; for we know of no Plant that is so absolutely vague and fluctuating, but has still a Body it adheres to; tho' that Body may be various, *e. g.* Earth, as in our common Plants; Stone, as in Rock Plants; Water, as in Sea Plants; Air, as in some Mucilages.

As to those few Plants that appear to float with the Water, their Manner of Growth is somewhat anomalous: Monsieur *Tournefort* has shewn, That all Plants do not arise strictly from Seeds; but that some, instead of Semen deposite or let fall a little Drop of Juice, which sinking in the Water, by its Gravity reaches the Bottom, or some Rock, &c. in its Way, to which it sticks, strikes Root, and shoots into Branches: Such is the Origin of *Coral*.

To which may be added, That a Root of a Plant may have any Situation at Pleasure with respect to the Body thereof; nor needs it be either lowest or highest, &c. Accordingly, in *Coral*, *Mosses*, *Fungus's*, &c. the Root is frequently uppermost, and its Growth downwards.

VEGETABLES are natural Bodies, having Parts organically form'd, but without Sensation.

VEGETABLE STATICKS, signifies the

Weight, or Gravity, and the Motion of the Juices in *Vegetable Bodies*.

It will not, I hope, be thought improper to set down that curious Account of a Book (intitl'd *Vegetable Staticks*, being an Essay towards a Natural History of *Vegetation*, by *Stephen Hales*, B. D. and F. R. S.) which was drawn up by Dr. *Desaguliers*, and publish'd in the *Philosophical Transactions*, since it will not only give the Reader an Idea of the many curious Experiments which are contain'd in that Book; but also give him a much clearer Notion of the Business of *Vegetation* than can be found in any Books yet extant.

The incomparable Sir *Isaac Newton* has not only shorten'd the Geometrician's Work, by his wonderful Discoveries in abstract Mathematicks, but has also taught us, by his own Practice, how to make, and judge of Experiments and Observations with the utmost Accuracy: And as he avoided making *Hypotheses*, he was so cautious as to deliver only by way of Queries several Truths which he was convinc'd of, because he wanted a sufficient Number of Experiments to make them as evident as those others, whereby he has so far improv'd and advanc'd natural Knowledge.

The Reverend Mr. *Hales* has follow'd his Steps, asserting nothing but what is evidently deduc'd from those Experiments, which he has carefully made, and faithfully related; giving an exact Account of the Weights, Measures, Powers and Velocities, and other Circumstances of the Things he observ'd, with so plain a Description of his *Apparatus*, and manner of making every Experiment and Observation, that as his Consequences are justly and easily drawn, so his Premises or Facts may be judg'd of by any body that will be at Pains to make the Experiments; which are most of them very easy and simple.

His Account of every thing is written in such an intelligible Manner, that the inquisitive Reader is capable of understanding it without being puzzled with perplex'd Calculations and complex Experiments, which Authors have sometimes contriv'd in order to be admired for those Things which they themselves found out, either by mere Chance, or with very little Labour: He has illustrated, and put past all Doubt, several Truths mention'd in Sir *Isaac Newton's* Queries; which tho' believed by some of our eminent Philosophers, were call'd in Question by others of an inferior Class, who were not acquainted with those Facts and Experiments upon which Sir *Isaac Newton* had built those Queries.

An Abstract of each Head is as follows.

I. Experiments, shewing the Quantity of Moisture imbibed, and perspired by Plants and Trees.

The Author having cover'd, with Mill'd, Lead, a Garden-Pot, in which a Sun-Flower was growing, so as to leave only one Passage for Air to communicate, and another to pour in Water to water the Plant, made several curious Experiments upon it.

1. That

1. That the Plants which weighed about 3 Pounds, perspired about 30 Ounces in a 12 Hours Day, in the Month of July 1724. but in a warm Night it perspired only 3 Ounces, and nothing in a cold Night; nay, sometimes it gain'd Weight by imbibing Dew.

2. That as the Area of the Surface of the Leaves was equal to 5616 square Inches; and the Area of Roots only to 2286 square Inches, the Water or Moisture imbib'd by the Roots to supply the Perspiration at the Leaves, must move faster in the Roots than through the Leaves, in the Proportion of 5 to 2. But in the Stem, whose transverse Section was one square Inch, faster than in the Leaves, in the Proportion of 5616 to 1.

3. That by comparing his Experiments made on this and other *Sun-Flowers* and *Plants* with Dr. Keil's Experiments mention'd in the *Medicina Statica Britannica*, it is evident, that a Man (Surface for Surface) perspires more than a Plant, in the Proportion of $3\frac{1}{2}$ to 1. That the Quantity of the Food of a Man is to the Food of a Plant nearly as 7 to 2; but Bulk for Bulk, the Plant imbibes into its Vessels 17 times more Fluid than the Quantity of the Chyle which enters into a Man's Vessels; and that because, as the Sap to Plants is less nutritive than Chyle to Man, it must be more in Quantity: To suck in the more Sap, a Plant has a very great Surface, and thereby (Perspiration promoting its imbibing of the Sap) perspires 17 times more than a Man in Proportion to their respective Weights.

4. That a Man or a Plant may perspire different Quantities, and yet continue in an healthy State.

A Man may perspire in 24 Hours from 1 Pound and an half to 3 Pounds; and a Plant, which at one time perspired but 16 Ounces, may, without being less healthy, perspire 28 Ounces in the same Time.

Mr. Hales observ'd, That in order to supply the Evaporation in the Leaves of a Vine, the Sap rose 152 Inches in 12 Hours, suppose the Sap to rise as dense as Water; but if it rises in a Steam, which must at least be 10 times rarer than Water, then the Velocity of the Sap will be 10 times greater, and consequently rise at the Rate of 152 Inches in an Hour.

N. B. That the Heat of the Sun should rarefy the Moisture of the Earth to that Degree, or a great deal more, to drive it into the Roots of Plants, is very probable from some Observations made by Mr. H. Beighton and Dr Desaguliers upon the Engine to raise Water by Fire; whereby it appears that the Steam or Vapour of boiling Water is rarer than the Water from which it was produced above 13000 times, when its Elasticity is equal to that of common Air.

This curious Experimenter, by his Observations on twelve *Ever-greens*, found, that they perspire much less than other Plants, and compares them to the exanguous Tribe of Animals; which as they perspire little, so they live the whole Winter without Food. He likewise observ'd, what Part of an Inch in Thickness is perspired by a Man, and by several Plants:

By a Man in 24 Hours $\frac{1}{76}$ Part of an Inch; and by the following Plants, viz. the *Vine*, the *Sun-flower*, the *Cabbage*, the *Apple-tree*, the *Lemon-tree*, $\frac{1}{97}$, $\frac{1}{67}$, $\frac{1}{54}$, $\frac{1}{47}$ Part of an Inch in 12 Hours.

That when the perspiring Surface is diminished by taking away the Leaves; the Power of imbibing is likewise diminished; for the same, which with the Leaves on, imbibed 30 Ounces in 12 Hours; without the Leaves, imbibed only 1 Ounce.

That Fruit will imbibe through the Stem, in Proportion to its Surface, he tried in an *Apple*, which imbibed as much as two Leaves equal to it in Substance.

That as the Leaves draw Nourishment to the Blossoms and Fruit, so they grow large first in those Places where the Blossoms are.

That *Hops*, in the Middle of an Hop-ground thrive best, because they imbibe and perspire least.

That by 9000 *Hop-Vines* growing on one Acre of Ground, 220 Gallons of Water are imbibed in a 12 Hours Day; which Quantity of Water is equal to a Depth of $\frac{1}{107}$ Part of an Inch spread on the same Surface.

That Fire-blasts (as the Gardeners call them) may be occasion'd by solar Rays reflected from, or condensed by Clouds, or even collected by Means of the dense Steams, which arise most plentifully in the Middle of the Hop-ground.

That the perspiring Matter of Trees is not protruded by the Power of the Vessels, but exhaled by Heat, which he proves by several curious Experiments.

He made Trees imbibe Spirit of Wine and other Liquors impregnated with Aromatics, which gave a Smell and Taste to the Stalk, Leaves, and Wood, but could not penetrate to the Fruit, by reason of the Fineness of the Capillary Sap-Vessels near the Fruit, which assimilated to their own Substance the high-tasted and perfum'd Liquors. Spirits kill'd the Trees, as far as they were imbibed, but scented Waters did not.

He receiv'd in proper Vessels the Matter perspired from Trees, which is a tasteless Water; but corrupts and stinks sooner than common Water.

He weigh'd three Cubick Feet of the same sort of (Brick) Earth, taken from the Surface of the Earth downwards, in July 1724 the lightest of which was about twice the Specific Gravity of Water: Then setting them to dry, found by the Loss of Weight how much Water they contain'd: the greatest Quantity exhal'd from a Cubick Foot being 10 Pounds, and the least 6 Pounds 11 Ounces *Averdupois* Weight.

In order to find the Heat of the external Air in Greenhouses and in Stoves; as also the Degrees of Heat at several Depths of the Earth, and in Hot-beds, he provided six *Barometers*, the Stems of which were of different Lengths, but adjusted in their mark'd Degrees; so that they began at their freezing Point, and ended at 90 Degrees, where the Heat was equal to warm Water, that may be born by the

the Hand, without stirring it about, which is the middle Point between freezing and the Heat of boiling.

By these *Thermometers* he observ'd the Degrees of Heat, in several Cafes, to be as follows: *Of the Blood* = 64. *Of the human Body* = 54. *Milk from the Cow*; and *Heat fit to hatch Eggs* = 55. *Urine* = 58. *Temperate Air* = 18. *Greatest Heat of Sun-shine in the Year 1724* = 74. and in the Year 1727 at 76. *The common Heat of the Noon-Sun in July* = 50. *Air in the Shade at the same time* = 38. *The Heat in May or June, fittest for Plants* = from 17 to 30 Degrees. *Autumnal Heat* = from 10 to 20. *A Hot-bed too hot for Plants, and about the Heat of Blood in Fevers* = 75. *Due Heat of a Hot-bed* = 56. *Heat under a Glass at the same time* = 34. and in the open Air = 17.

He observed the Air to be cooler than the Earth out of the Sun, but hotter in Sun-shine; and that as soon as the Sun is so far decreas'd, as no longer to give a brisk Agitation to (or turn into Steam) the Moisture of the Earth, the Leaves of the Plants fall off.

II. Experiments to find the Force with which Trees imbibe Moisture.

This Author contriv'd an *Aqueo-mercurial Gage*, in order to make a just Estimate of the Force with which the Moisture is drawn up by Plants and Trees.

He took a Glass Tube of an Inch diameter, and about eight Inches long; into one End of which he cemented a smaller Tube of about one-fourth of an Inch diameter, and eighteen Inches long; into the other End he successively cemented a Root or Branch, or Stem of a Tree or Plant, whose imbibing Force he wanted to find out; which he did in the following manner, *viz.*

He turned the small End of the Gage upwards, and having poured Water into it, down upon the Wood cemented in, he stopped the Orifice with his Finger; then turning the little End downward again, he plac'd it into a Vessel of *Mercury*, before he took off his Finger: Which when he had done, he made his Observations.

For as the Plant imbib'd the Water, the *Mercury* rose up in the small Tube, following the Water, and shewing, by its Height, the Force of imbibing; and for every Inch that the *Mercury* rose, Water would have risen $13\frac{1}{2}$ Inches, as it is so much lighter specifically than *Mercury*.

With this Gage he made Experiments upon Roots and Branches in an erect, Branches in an inverted Situation; large ones as well as small, even to Sprigs of Plants and Fruits, and found that all of them imbib'd the Water, so as to raise the *Mercury* in the small Tube, but to different Heights.

The *Mercury* was rais'd the quickest, and to the greatest Height, *viz.* twelve Inches in seven Minutes by a *Nonpareil* Branch, two Feet high, with twenty Apples, and several lateral Branches, whose transverse Section was five-eighths of an Inch diameter.

It is to be observed, that the *Mercury* rose highest in a warm Sun; but the whole Force of imbibing was much greater than the *Mercury* should shew, because several Bubbles of Air came out of the Section of the Branch as the Water went up, which happen'd most in large Branches, which rais'd the *Mercury* but to a small Height; but Branches stripp'd of their Leaves, hardly rais'd it at all.

He also made *Peas* imbibe Water under the Pressure of great Weights, and found that *Peas*, when swell'd, sustain'd a Weight equal to 1600 Pounds by their Force of imbibing and growing.

The Force of imbibing he shews to be owing to the attractive Power of the Particles of which Plants are made up; all kinds of Wood (even Cork) when their Particles are well soak'd, being heavier than Water.

N. B. It is very difficult to soak Cork so thoroughly as to make it heavier than Water; but it was found to be true, in a Tube where a Cork had been seal'd up with Water for four Years, so as to be moveable in the said Water.

III. Experiments shewing the Force of the Rise of the Sap in the Vine in the bleeding Season.

The said Author, by a very curious Contrivance of Glass Tubes, screw'd and cemented at the Top of one another, and altogether fixed to the Stem of a Vine, observ'd, that in the bleeding Season, *viz.* in *March* and *April*, the Sap will rise into the Tubes by the Force of the Roots and Stem, to very great Heights even above the Top of the Vine, as it did up to the Top of a Tube twenty-five Feet high, in two Hours, and run out at the said Tube, tho' seven Feet above the Top of the Vine: But the Force was such, that the *Mercury* in a Gage (in other Experiments) was push'd up $32\frac{1}{2}$ Inches high, which was equivalent to above 43 Feet of Water.

This is a much greater Force than the Blood is impell'd with in Animals: Which last Force he try'd in the Crural Artery of an Horse, of a Dog, and of a Deer; for having ty'd them down alive upon their Backs, and fix'd a Glass Tube to the Crural Artery opened, he found that in the Horse the Blood arose above eight Feet, in the Dog about seven Feet, and in the Deer not quite six: And these Heights are five, seven, and eight times less than the Height to which the Sap is rais'd by the Vine.

The Sap rises all Night, but most in the Morning of a warm Day, but in very hot Weather it ceases to rise about ten in the Morning, and then begins to rise again about three or four in the Afternoon; and, during the great Heat, Bubbles of Air drawn in by the Roots come up the Tube from the Section of the Stem, the Sap in the Tube sinking and rising as the Weather is cloudy or clear, like the Liquor in a *Thermometer*.

That the Force was not only in the Root, but in the Stem and Branches, appear'd by several Experiments: One of which was That

a Vine at forty four Feet four Inches in Distance from the Root, push'd up Sap with the Force of a Column of thirty Feet eleven Inches of Water.

He also shews, by a nice Experiment, that the Sap does not come indifferently through all the *Interstices* of the Wood, but is confin'd to its proper Vessels.

The Fibres or Capillary Tubes, out of the bleeding Season, cannot protrude the Sap beyond their Orifices in the Section of the Stem; but assisted by the Perspiration of the Leaves, the Sap will rise in that very Branch, which will imbibe Water, if it was cut off, and a Tube applied to it, with Water pour'd in; nay, it would also imbibe Water at the small End.

IV. *Experiments shewing the ready lateral Motion of the Sap, and consequently the lateral Communication of the Sap-Vessels; the free Passage of it from the small Branches towards the Stem, as well as from the Stem to the Branches; with an Account of some Experiments relating to the Circulation and Non-circulation of the Sap.*

The Analogy there is in many respects between Plants and Animals, has given Occasion to several ingenious Persons to imagine, that the Sap must circulate in Plants, as the Blood does in Animals: and being fond of this new Hypothesis, they have contented themselves with a few Experiments that seem to confirm the Notion; and instead of making a sufficient Number of Experiments and Observations, and comparing them impartially, they have supply'd the rest by Conjectures, and endeavour'd to support their Hypothesis by other new Suppositions.

It is upon this Account they have suppos'd particular Vessels (like Arteries) to carry up the Sap from the Roots to the Extremities or Leaves, and others (like Veins) to bring down the Sap back again to the Roots, imagining the former to come down between the Bark and the Wood: But they did not consider, that a Plant is very differently nourish'd from an Animal, and therefore requires a very different Mechanism and Structure for its Growth and Support.

The Reverend Mr. Hales has disprov'd the above-mentioned Opinion, by several Experiments and Observations; the chief of which are these that follow.

1. Having cut a long Notch in a growing Branch which had Leaves on, he observ'd that the Notch was moist at the Bottom towards the Root, and not at the Top.

2. He made the same Experiment with another Branch set in Water, which imbibed the Liquor at a transverse Section below the Notch, and found the Notch as before.

3. He observ'd, that in the *Spring* the Sap rises plentifully between the Bark and the Wood, and that chiefly in Vines; and that if a Ringlet of Bark be taken off all round in bleeding Trees, the Bleeding abates most in the upper Part of the bare Place.

4. The Sap will move any Way by the Attraction of the same Capillary Tubes, and Perspiration of the Leaves, shewn by the Branch of an *Apple-tree*, which drew up Moisture plentifully at the small End: Also by a Tree which thrrove, tho' its Root was taken out of the Ground, receiving its Nourishment only from two other Trees to which it was inarched, and from which it was suspended; and likewise by a Bough, with two Branches cut off from a Tree; one Branch of which out of the Water, preserved its Verdure, and received its Nourishment from the other Branch immers'd in Water, whilst another Bough of the same Sort, without that Help, immediately wither'd.

By another Experiment he prov'd chiefly, that there is a lateral Motion of the Sap thro' Vessels, whereby the longitudinal Capillary Fibres communicate with one another, viz.

He cut four long Notches, one above another (but looking towards the several Cardinal Points) in a pretty large Branch, whose Section, some Inches below the said Notches, was immers'd in Water; and found that by the Attraction of the Fibres, and Perspiration of the Leaves, the Moisture rose plentifully, notwithstanding that the Continuity of the greatest Part (if not all) the longitudinal Fibres was destroy'd by those deep Notches.

The lateral Motion may also be deduced from observing, that Branches will grow out of Roots, and thrive very well; and that *Elders*, *Sallows*, *Willows*, *Briers* and *Vines* will grow by putting either End of a Stem or Branch into the Ground.

He observes, that there is, indeed, an alternate receding and progressive Motion of the Sap, which recedes when cold Weather and Rain succeeds hot Sun-shine, the Trees then imbibing the Rains and Dews which fall upon the Leaves; but upon the Return of the hot Weather, the Perspiration is renew'd, and the Sap rises again.

This is sufficient to account for *Jessamine* and the *Passion-tree* receiving a gilded Tincture below the gilded inoculated Bud; which has been given as an Instance of the Circulation of the Sap: But the *Ilex* grafted on the *English Oak*, as it keeps (whilst the Oak sheds) its Leaves in Winter, shews that the Sap does not circulate.

V. *Experiments whereby to prove, that a great Quantity of Air is inspired by Plants.*

He makes it appear on this Head, that Plants imbibe a great deal of Air, not only that which comes up with the Sap from the Earth (the Earth containing Air both in an elastick and in a fix'd State) but also take it in through the old Eyes and Bark, especially at Night, when the Plants are in an imbibing State.

The Experiments whereby he proves the said Assertion, are chiefly these, viz.

1. An open, empty Glass Tube set upright, had an *Apple* Branch cemented in its upper End, the other End set in a Vessel of Water; upon

upon which the Air went up into the Branch out of the Tube, as appear'd by the rising of Water into the Tube.

2. A Cylinder of Birch of about $\frac{3}{4}$ of an Inch diameter, with the Bark on, cemented in the Middle to the Top of an Air-Pump Receiver, so as to fill up the Hole at the Top of the said Receiver upon the Plate of the Air-Pump; then in working the Pump, Air came out at the Bottom of the said Cylinder (bubbling up through the Water in the Vessel) whether erect or inverted, cemented close on the Top-section or not, and whether the old Eyes in the Sides were cemented up, or left bare, the Bark itself being previous to the Air; but then it took in less Air than when the old Eyes and upper Section were open.

3. When Water (pour'd into a cylindrick Glas fix'd over the Receiver) cover'd that Part of the Wood which was out of the Receiver, no Air came through the Bottom; and when the Water was taken away from covering the upper Part of the Wood, the Air did not come in through the Bottom, till the Top of the Cylinder of Wood had its Bark well dry'd.

4. He observes with Dr. Grew, that the Mouths of the Air Vessels are visible in the Leaves of Pines, and in the Trunks of several Plants, with a Microscope; and in some even without a Glas.

5. In making Experiments upon young Shoots, as their Vessels are full of Sap, he did not find that the Air passed into or through them (the Air in them probably being become fixed) but it came in freely at the Roots, apply'd to the Air-pump in the same Manner as in the Piece of Birch.

VI. *A Specimen of an Attempt to analyze the Air, by the Reverend Mr. Stephen Hales, by a great Variety of Chymio-Statical Experiments, which shew in how great a Proportion Air is wrought into the Composition of animal, vegetable and mineral Substances; and withal, how readily it resumes its former elastick State, when in the Dissolution of those Substances it is disengag'd from them.*

The excellent Mr. Boyle, among his many Discoveries, found that Air was producible from Vegetables, by putting Grapes, Plums, Gooseberries, Cherries, Pease, and several other Sorts of Grain into exhausted and unexhausted Receivers, where they continued several Days, emitting great Quantities of Air. But Mr. Boyle did not shew the Way to know exactly, how much Air a certain Quantity of vegetable Substance will produce.

The incomparable Sir Isaac Newton (*Query 31. of his Opticks*) observes, "That true permanent Air arises by Fermentation or Heat, from those Bodies which the Chymists call fixed, whose Particles adhere by a strong Attraction, and are not therefore separated and rarefied without Fermentation."

"Those Particles receding from one another with the greatest repulsive Force, and

"being most difficultly brought together, which, upon Contract, were most strongly united. And (*Query 80.*) dense Bodies by Fermentation, rarefy into several Sorts of Air; and this Air, by Fermentation, and sometimes without it, returns into dense Bodies."

The Reverend Mr. Hales, from the Consideration of this and some of his own Experiments, concluded, that there must be Air not only in an elastick, but in a fix'd State, in Vegetables and other Substances, and therefore that the Air-pump would not be sufficient to get all the Air out of Bodies: For which Reason he contrived Ways of getting the Air out of several Substances, by Fire (distilling them) and Fermentation, and made use of a very ingenious, but simple and certain Method, of measuring the Quantity of Air generated from (or absorb'd by) the several Kinds of Bodies, upon which he made Experiments.

The Description of his Hydrostatical Gages, and the Manner of his making his Experiments, not being to be given better and shorter than in his own Words, are as follow:

In order to make an Estimate of the Quantity of Air, which arose from any Body by Distillation or Fusion, I first put the Matter which I intended to distil into a small Retort (*Figure 4.*) and then at *a* cemented fast to it the Glas Vessel *a b*, which was very capacious at *b*, with a Hole in the Bottom, which

I bound a Bladder over the Cement, was made of Tobacco-pipe Clay and Bean-flower, well mix'd with some Hair, tying over all, four small Sticks, which serv'd as Splinters to strengthen the Joint; sometimes instead of the Glas Vessel *a b*, I made use of a large Bolt-head, which had a round Hole cut, with a red-hot iron Ring at the Bottom of it; through which Hole was put one Leg of an inverted Syphon, which reach'd up as far as *z*: Matters being thus prepar'd, holding the Retort uppermost, I immers'd the Bolt-head into a large Vessel of Water, to *a*, the Top of the Bolt-head; as the Water rush'd in at the Bottom of the Bolt-head, the Air was driven out through the Syphon, when the Bolt-head was full of Water to *z*; then I clos'd the outward Orifice of the Syphon, with the End of my Finger, and at the same time drew the other Leg of it out of the Bolt-head, by which Means the Water continued up to *z*, and could not subside, while it was in the Water, the Vessel *x x*; which done, I lifted the Vessel *x x* with the Bolt-head in it out of the Water, and ty'd a waxed Thread at *z*, to mark the Height of the Water, and then approach'd the Retort gradually to the Fire, taking Care to skreen the whole Bolt-head from the Heat of the Fire.

The Descent of the Water in the Bolt-head shew'd the Sum of the Expansion of the Air, and of the Matter which was distilling: The Expansion of the Air alone, when the lower Part of the Retort was beginning to be red-hot, was at a Medium, nearly equal to the Capacity

Capacity of the Retort, so that it then took up a double Space, and in a white and almost melting Heat, the Air took up a triple Space, or something more, for which Reason the least Retorts are best for these Experiments. The Expansion of the distilling Bodies was sometimes very little, and sometimes many times greater than that of the Air in the Retort, according to their different Natures.

When the Matter was sufficiently distilled, the Retort, &c. was gradually remov'd from the Fire, and when cool enough, was carried into another Room, where there was no Fire. When all was thoroughly cold, either the following Day, or sometimes three or four Days after, I mark'd the Surface of the Water y , where it then stood; if the Surface of the Water was below z , then the empty Space between y and z , shew'd how much Air was generated, or rais'd from a fix'd to an elastick State, by the Action of the Fire in Distillation: But if y , the Surface of the Water, was above z , the Space between z and y , which was fill'd with Water, shew'd the Quantity of Air which had been absorbed in the Operation, *i. e.* was chang'd from a repelling, elastick, to a fixed State, by the strong Attraction of other Particles, which I therefore call *absorbing*.

When I would measure the Quantity of this new generated Air, I separated the Bolt-head from the Retort; and putting a Cork into the small End of the Bolt-head, I inverted it, and poured in Water to z : Then from another Vessel (in which I had a known Quantity of Water by Weight) I poured in Water to y ; so the Quantity of Water which was wanting, upon weighing this Vessel again, was equal to the Bulk of the new generated Air. I chose to measure the Quantities of Air, and the Matter from whence it arose, by one common Measure of Cubick Inches, estimated from the specifick Gravities of the several Substances, that thereby the Proportion of one to the other might be the more readily seen.

I made Use of the following Means to measure the great Quantities of Air, which were either rais'd and generated, or absorbed by the Fermentation arising from the Mixture of Variety of solid and fluid Substances, whereby I could easily estimate the surprising Effects of Fermentation on the Air, *viz.* I put into the Bolt-head b (Fig. 5.) the Ingredients, and then run the long Neck of the Bolt-head into the deep cylindrical Glass $a y$, and inclined the inverted Glass $a y$; when it was almost up to a , the Top of the Bolt-head, I then immers'd the Bottom of the Bolt-head, and lower Part y of the cylindrical Glass under Water, raising at the same Time the End a uppermost. Then before I took them out of the Water, I set the Bolt-head, and lower Part of the cylindrical Glass $a y$, into the earthen Vessel $x x$, full of Water,; and having lifted all out of the great Vessel of Water, I marked the Surface z of the Water in the Glass $a y$.

If the Ingredients in the Bolt-head, upon fermenting, generated Air, then the Water

would fall from z to y , and the empty Space $z y$, was equal to the Bulk of the Quantity of Air generated: But if the Ingredients, upon Fermentation, did absorb or fix the active Particles of Air, then the Surface of the Water, would ascend from z to n , and the Space $z n$, which was filled with Water, was equal to the Bulk of Air which was absorbed by the Ingredients, or by the Fume arising from them: When the Quantities of Æther, either generated or absorbed, were very great, then I made use of large Chymical Receivers, instead of the Glass $a y$; but if these Quantities were very small, then, instead of the Bolt-head, I used a deep cylindrical Glass, or a common Beer Glass inverted, and placed under it a Phial or Jelly Glass, taking Care that the Water did not come at the Ingredients in them; which was easily prevented, by drawing the Water up under the inverted Glass, to what Height I pleas'd, by Means of a Syphon.

I measured the Bulk of the Spaces $z y$, or $z n$, by pouring in a known Quantity of Water, as in the foregoing Experiment, and making an Allowance for the Bulk of the Neck of the Bolt-head within the Space $z y$.

By these Experiments that the ingenious Author made upon several Substances, it appeared, that some by Distillation, and some by Fermentation, would generate Air, others would absorb it; and some again would absorb Air at one time, and generate it at another; and oftentimes, that more Air was generated by Fermentation than by Fire. I have made a Table, the better to demonstrate what the Effects were, which I shall insert in the succeeding Page, that the Reader may have it before him at one View.

Dr. Desaguliers adds, That as several Persons may be willing to try a great many of Mr. Hales's Experiments, he thought it proper to mention here, that the Experiments on Substances that generate Air, made with a Glass Retort, are difficult and tedious; but a Musket Barrel with the Touch-hole welded up, and then turned into a Semicircle, makes a very commodious Iron Retort, whose close End being put into the Fire of a Smith's Forge, will be so heated, with a little blowing, as to get the Air out of any Substance in a very little Time; having first twisted on upon the open End of the Barrel, one End of a leaden Syphon (which will be very tight, with only a little Sheep's Leather between) whilst the other End of the Syphon goes up a little Way into an inverted Chymical Receiver, fill'd with Water.

As the Air gets out of the Substances distilled, it comes bubbling up through the Water, which it depresses by its Bulk.

N. B. Antimony and Sulphur must not be made Use of in this Barrel, because they will demetalize the Iron; nor Lead, because it will sweat out through the Iron.

The

The said TABLE is as follows :

Bodies which generated Air.	Bodies which absorb Air.	Bodies which sometimes generated and sometimes absorb'd Air.
Hog's Blood Tallow Fallow Deer's Horn Oyster Shells A Piece of Oak Indian Wheat Pease Mustard-seed Amber Tobacco Oil of Anniseed Oil of Olives Honey Newcastle Coal Wax Earth Salt Antimony Pyrites from Walton Heath Sea-salt Nitre Calculus Humanus Vitriol Bones Red Lead Chalk Wheat and Barley Filings of Mercury with Oil of Vitriol and Water.	Salt of <i>Sal Armoniac</i> <i>Phosphorus</i> Acid Spirits Lime <i>Pulvis Aureus</i> Brimstone Matches, burning A burning Candle Living Animals, e. g. a Cat Human Lungs in breathing Filings of Iron with Spirit of Nitre Filings of Iron with Spirits of Hartshorn Filings of Iron with Spirit of <i>Sal Armoniac</i> N. B. When a lighted Candle is put into that Air which had been foul'd by a Candle burning, and going out in it, tho' it burn'd but a fifth Part of the Time that it had done before, it absorb'd as much Air; which shews, that Air loaded with Vapours is more apt to lose its Elasticity, than clear Air.	Gun-powder Apples mash'd Filings of Steel and <i>Aqua Fortis</i> Scurvy-grass Leaves <i>Sal Armoniac</i> mix'd with Oil of Vitriol Spirit of Turpentine mix'd with Oil of Vitriol Vinegar poured on Oyster Shells Lemon Juice Ale Malaga Raisins. N. B. Most of the above mention'd Substances were in an absorbing State in cold Weather.

It appeared by several Experiments, that the Air which was got out of the Substances above-mentioned, was true permanent Air; for it had, and after many Days, continued to have, both the Weight and Elasticity of common Air, of which a Cubit Inch weighs $\frac{7}{8}$ of a Grain, and after it had been compress'd, it would expand again to its former Dimensions.

Most of that Air had a poisonous Quality; a Sparrow dying as soon as it was put into the Air made of Oak, eleven Days after the said Air had been made. So Mr. Boyle found the Air, drawn by the Air-pump, from Bread, and some other Substances, to have a poisonous Quality.

Air generated by *Indian Wheat*, and by Pease, and most other Substances, flash'd when the Candle was apply'd to it.

The most solid Parts of Animals or Vegetables commonly generated the moist Air; Oak $\frac{1}{3}$ of its Weight, and 216 times its Bulk; and the Pease more than $\frac{1}{3}$ of their Weight, and 396 times their Bulk. But of all Substances, a Stone taken from the Bladder of a Man, generated moist Air; namely, a Quantity of Air 645 times the Bulk, and above half the Weight of the Stone.

Our indefatigable Philosopher, to judge the better of the Result of these Experiments, contriv'd a Gage with a Tube seal'd at one End, and having the other (open End) immers'd in Mercury cover'd with Honey, which in the Rise of Mercury in the Glass, would leave a Mark, to shew how far the Mercury had risen. (See the Description and Draught of it in his Book, Page 205.) By the Force of compress'd Air, or of the Air that is generated from several Substances, whilst confin'd, and proposes this Gage for measuring the Depth of the Sea, which must answer better than any Contrivance hitherto try'd.

From observing that it would require a Force 48 times greater than that of the Atmosphere, to compress the Air that comes out of an Apple into the same Space again, (which, in an Apple of 16 square Inches Surface, is equal to 11776 Pounds) he concludes, that the greatest Part of the said Air must be in a fix'd State, and preserv'd in that State by the Attraction of the Particles of Air and Apple in their Cohesion; otherwise Fruits and all other Substances that contain much Air, would be torn to Pieces by its repellent Force, with a greater Explosion than that of Gun-powder; and therefore that the Air, when extricated,

does not consist of fibrous Particles wound up like little Springs; but of Particles that do not touch one another, but have a repellent Force, which is reciprocally proportionable to the Distances of the Particles, agreeable to what Sir Isaac Newton says in his *Opticks*, Query 31.

The Particles when they are shaken off from Bodies by Heat or Fermentation, so soon as they are beyond the Reach of the Attraction of the Body, receding from it; as also from one another, with greater Strength, and keeping at Distance so, as sometimes to take above a Million of times more Space than they did before in the Form of a dense Body; which vast Contraction and Expansion seem unintelligible, by feigning the Particles of Air to be spongy and ramous, or roll'd up like Hoops, or by any other Means than by a repulsive Power.

Our Author made some Experiments upon a Calf's Lungs, which help to confirm Dr. James Keil's Assertion, viz. That the inner Surface of a Man's Lungs is equal to about 150 square Feet, which is about 10 times more than the Surface of the whole Body. Then, by several Experiments and curious Observations, found, that of the Air which is inspir'd by the Lungs in an Hour, (viz. 48000 cubick Inches) about 353 Inches, or 100 Grains in Weight, are destroy'd in that Time.

He shews that the Reason that sulphureous Air is pernicious, is, because it loses its Elasticity so fast, that the Lungs will subside in it, and the Blood consequently stagnate. He concludes, that when the Particles of such Air are united into pretty large *Molecular*, in a fix'd State, they are too big to enter into the Vessels of the Lungs.

He shews the Mistake of those, that suppos'd the Air did not lose its Elasticity, but its *vivifying Spirit*, by Vapours, by an Experiment made upon a Dog, into whose Lungs he drove by Force, that effete Air, which the Dog, by his own Action, could not draw into his Lungs; and whereas the Dog then was just expiring by the Subsiding of his Lungs, he kept him alive by the forcible Impulsion of that very Air, as long as he could blow up the Dog's Lungs with it.

He makes it appear, that a close, warm Air, without a Communication with the outward Air, to carry off the Vapours, must be unfit for Breathing long, and therefore condemns the Use of German Stoves.

That when Animals are kill'd by Lightning, without any visible Wound, it is because the sulphureous Steams have destroy'd the Elasticity of the Air about them: As appears by dissecting such Animals, whose Lungs are always found compress'd together, without any Air in them. The same also appears in Men that have been kill'd by Damps in Mines.

Then he gives the Description of an Instrument, whereby four or five Quarts of the same Air (which, in the common Way, can serve one Man to breathe very little above a Minute) may serve 8 $\frac{1}{2}$ Minutes to breathe, by drawing in the Air, which has been in the

Lungs, through four Diaphragms of Flannel, dipp'd in a *Lixivium* of highly calcin'd Salt of Tartar, and afterwards dry'd, and blowing back the same Air in such manner, that it may, at every Inspiration, return through the said Diaphragms; which is done by Means of two Valves. The Moisture and sulphureous Vapours of the Air, are, by this Contrivance, stopp'd in passing through the Flannel, and thereby the Air continues wholesome much longer than it would in the common Way of Breathing: This he proposes as useful to those who have Occasion to go into Places where the Air is infectious; but where the noxious Vapours are not very dense, Mufflers only of Cloth or Flannel, impregnated with Salt of Tartar, may serve; as he found by several Experiments.

He shews afterwards the Reasons why *Pulvis Fulminans* has more Force than Gun-powder, and confirms Sir Isaac Newton's Account of Fire and Flame, (Query 9 and 10 of his *Opticks*) but shews Dr. Newenmy's, Dr. Boerhaave's, and Monf. L'Emery's Account of Fire to be erroneous; but that it was not the Matter of Fire, but elastick Air, which that last nam'd Gentleman had so often observ'd to be lost in the Analysis of Bodies.

That the Artificial Sulphur made by Monf. Geoffroy was inflammable, chiefly on account of the Air supply'd to it by the Oil of Tartar.

That if Fire was a peculiar Matter, it ought to dilate, not to condense the Air; as it appears to do by Experiment. That Fire consists in the Action and Re-action between repellent Air and attracting Sulphur; and that Heat is communicated by the ætherial Medium mentioned by Sir Isaac Newton in the last Edition of his *Opticks*.

That Fermentation will dissolve Bodies without the Help of included Fire, acting according to its several Degrees; a lower Degree of it (such as attends every intestine Motion) not being inconsistent with the healthy State of Plants and Animals.

That acid Particles, by their great attractive Force, dissolve Bodies rushing towards their Particles, so as to excite Heat, and shake asunder some of them, and turn them into Air.

That Air in a fix'd State is the Bond of Union, which makes Salts durable, and which keeps together the solid Parts of *Vegetables*, of Animals, and even Globules of the Blood.

That the Air, in a moist State, is sooner absorb'd by sulphureous Steams than in a dry State; for a Candle, which in a dry Receiver burn'd 70 Seconds, burn'd but 64 in the same Receiver, when it was fill'd with the Fumes of hot Water; but yet absorb'd $\frac{1}{2}$ Part more of Air. But the absorbing Substances lose the Force of Acting, when united in a large Body; Brimstone in a Roll absorbing no Air, tho' it does it so plentifully, when reduc'd into minute Particles.

That some of the Food of Animals generates, and some absorbs Air, and the Digestion in a healthy State is best perform'd when there

there is but a little more Air generated than is absorb'd.

From the Consideration of the several Experiments made by Mr. Hales, in his *Analysis of Air*, he makes it appear, that our Atmosphere is a Chaos of different Particles; some of which are elastick and some unelastick; and that the elastick Parts are endued with very different Degrees of Elasticity, according as they are bigger or less, more or less solid, more or less watry; and therefore, that some are easily, and some more difficultly reducible to a fix'd State.

That it is chiefly by the Change of Air, from a fix'd to an elastick, and from an elastick to a fix'd State, that this beautiful *Frame of Things* is maintain'd in a continual Round of the Production and Dissolution of animal and vegetable Bodies; and therefore, that there is as much Reason to adopt Air among the chymical Principles, as acid Sulphur, tho' it has hitherto been rejected by the Chymists.

VII. *The Author in this Chapter applies his several Experiments and Conclusions drawn from them, to Vegetation; and shews chiefly the following Things, viz. That Vegetables are compos'd of Sulphur, Volatile Salt, Water, Earth, and Air.*

That in Nutrition, the Sum of the attracting Powers of those Substances is superior to the Sum of the repellent; and as the watry Vehicle flies off, the Parts harden.

That Oil which is made up of Sulphur and Air, abounds in Seeds for their better Preservation.

That in cold Countries, where those Principles are not so firmly united, small Wines such as *Rhenish*, must easily yield their Tartar, (which by Experiments appear to contain Oil and Air); but generous Wines, such as *Madera*, having those Principles more firmly united, will bear a great Degree of Heat before they part with them.

That the Use of the Leaves of Trees, is to bring up Nourishment within the Reach of the Attraction of the Fruit, to carry off the redundant watry Fluid; to imbibe Rains and Dews which are impregnated with Salt and Sulphur; as likewise to imbibe Air, and to be of the same Use to Plants, as Lungs are to Animals.

These Plants which are overshaded, or too replete with Moisture, cannot so well imbibe Air; therefore, tho' they will shoot out fast, and have much Wood, they will be more barren in proportion.

He also, by a very ingenious Contrivance, found the Degrees of growing in every Part of young Shoots, which in their growing extend themselves most in the Middle, and least towards the Top and the Bottom; the ductile Matter for their Growth being drawn out in Length, like melted Glass Tubes, which retain a Howness, though drawn out to the smallest Thread.

N.B. *In some Animals there is such a tough ductile Substance, which hardens when expos'd*

to the Air in small Threads, as in Spiders and Silk-worms.

He shews that the Pith serves to supply the dilating Moisture for the tender Shoots; but that their Figure may be oblong, and not round, as the Fruit commonly is; there are tough Diaphragms in the Pith, at small Distance from each other, which check the lateral Expansion; as also horizontal Fibres, which serve for the same Purpose: And of the same Sort is the Pith in the large growing Feathers of Birds; which is made up of Vesicles, that can be distended lengthwise, but have Splinters at the Ends, to prevent too great a lateral Dilatation.

That the Bones of Animals do not grow at the Joynts, (which would prevent their free Motions) but at the *Symphysis*, viz. where the Heads join to the Shanks of the Bones.

That there are particular Vessels in *Vegetables*, as well as Animals, appropriated for conveying different Sorts of Nutriment; and that where a viscid Substance is to be furnished, the Vessels are lengthened, and often fetch a Compass to retard the Velocity of the Fluid, which is to be inspissated into a hard Substance. Thus in hard Stone-Fruits the umbilical Vessel goes round the Concave of the Stone, and then enters the Kernel near its Cone.

Then at last he traces the *Vegetation* of a Plant, from a Seed to a Tree again producing Seed; which Account, as it cannot well be contracted, without leaving out something material; and as it serves to shew some of the excellent Uses of his happy Discoveries, it shall be given in his own Words.

Supported by the Evidence of many of the foregoing Experiments, I will now trace the *Vegetation* of a Tree, from its first seminal Plant in the Seed, to its full Maturity and Production of other Seeds, without entering into a particular Description of the Structure of the Parts of *Vegetables*, which has already been done by Dr. Grew and Malpighi.

We see by Experiment, 56, 57, 58, on distill'd Wheat, Pease, and Mustard-seed, what a wonderful Provision Nature has made, that the Seeds of Plants should be well stored with very active Principles; which Principles are there compacted together by Him, who curiously adapts all Things to the Purposes for which they are intended, with such a just Degree of Cohesion, as retains them in that State 'till the proper Season of Germination: For if they were of a more lax Constitution, they would too soon dissolve, like the other tender annual Parts of Plants; and if they were more firmly connected, as in the Heart of an Oak, they must necessarily have been many Years in germinating, though supply'd with Moisture and Warmth.

When a Seed is sown in the Ground, in a few Days it imbibes so much Moisture, as to swell with very great Force; as we see in the Experiment on Pease in an iron Pot. This forcible swelling of the Lobes of the Seed *ar*, *ar* (Fig. 1.) does probably protrude Moisture and Nourishment from the capillary Vessels

r, r , which are called the Seed-roots, into the Radicle c, z, d , which Radicle, when it is thus shot some Length into the Ground, does then imbibe Nourishment from thence; and after it has acquir'd sufficient Strength, as this tender ductile Root is extending from z to c , it must necessarily carry the expanding Seed-lobes upwards, at the same Time that the dilating from z to d makes it shoot downwards; and when the Root is thus far grown, it supplies the Plume b with Nourishment; which thereby swelling and extending, opens the Lobes a, r , a, r , which are at the same time raised above Ground, with the Plume i , where they, by expanding and growing thinner, turn to green Leaves (except the Seeds of the Pulse Kind); which Leaves are of such Importance to the yet tender Plume, that it perishes, or will not thrive if they are pulled off; which makes it probable, that they do the same Office to the Plume, that the Leaves adjoining to Apples, Quinces, and other Fruit do to them, *viz.* they draw Sap within the Reach of their Attraction, (see *Exper.* 8, 30.); but when the Plume is so far advanc'd in Growth, as to have Branches and expanded Leaves to draw up Nourishment, then these supplemental, feminal Leaves a, r , a, r , being of no farther Use, do perish; not only because the now grown and more expanded Leaves of the Young Plant or Tree do so overshadow the supplemental Leaves, that the former more plentiful Perspiration is much abated; and thereby not only their Power of attracting Sap fails, but also because the Sap is drawn from them by the Leaves; and they being thus depriv'd of Nourishment, do perish.

As the Tree advances in Stature, the first, second, third, and fourth Order of the lateral Branches shoot out, each lower Order being longer than those immediately above them; not only on the account of Primogeniture, but also because being inserted in larger Parts of the Trunk, and nearer the Root, they have the Advantage of being serv'd with greater Plenty of Sap, whence arises the beautiful parabolical Figure of the Tree.

But when Trees stand thick together in Woods or Groves, then their natural Shape is altered; because the lower natural Branches being much shaded, they can perspire little; and therefore drawing little Nourishment, they perish; but the top Branches being expos'd to a free, drying Air, they perspire plentifully; and thereby drawing the Sap to the Top, they advance much in Height. But, *vice versa*, if when such Grove of tall Trees is cut down, there be left here and there a single Tree, that Tree will then shoot out lateral Branches, the Leaves of which Branches now perspiring freely, will attract Plenty of Sap; on which account, the Top being depriv'd of its Nourishment, it usually dies.

And as Trees in a Grove or Wood grow only in Length, because all the Nourishment is by the Leaves drawn to the Top, most of the small, shaded, lateral Branches, in the mean time perishing for want of Perspiration and Nutrition:

So the Case is the very same in the Branches of a Tree, which usually making an Angle of about 45 Degrees with the Stem of the Tree, do thereby beautifully fill up, at equal and proper Distances, the Space between the lower Branches and the Top of the Tree, forming thereby, as it were, a parabolical Grove or Thicket; which shading the Arms, the small lateral Shoots of those Arms usually perish, for want of due Perspiration; and therefore the Arms continue naked, like the Bodies of Trees in a Grove, all the Nourishment being drawn up to the Tops of the several Branches by the Leaves, which are there expos'd to the warm Sun, and free drying Air, whereby the Branches of Trees expand much.

And where the lateral Branches are very vigorous, so as to make strong Shoots, and attract the Nourishment plentifully, there the Tree usually abates of its Height, as in Groves, there commonly its lateral Branches being smallest: So that we may look upon a Tree as a complicated Engine, which has as many different Powers as it has Arms and Branches, each drawing from their common Fountain of Life, the Root; and the whole of each yearly Growth of the Tree, will be proportionable to their attracting Powers, and the Quantity of Nourishment the Root affords. But this attracting Power or Nourishment will be more or less, according to the different Ages of the Tree, and the more or less kindly Seasons of the Year.

And the proportional Growth of their lateral and top Branches, in relation to each other, will much depend on the Difference of their several attracting Powers.

If the Perspiration and Attraction of the lateral Branches is little or nothing, as in Woods or Groves, then the top Branches will mightily prevail; but when in a free open Air, the Perspiration and Attraction of the lateral Branches come nearer to an Equality with that of the Top, then is the aspiring of the top Branches greatly check'd. And the Case is the same in most other *Vegetables*, which, when they stand thick together, grow much in Length, with very weak, lateral Shoots.

And as the Leaves are thus servicable in promoting the Growth of a Tree, we may observe, that Nature has plac'd the Petals or Leave-stalks where most Nourishment is wanting to produce Leaves, Shoots, and Fruit; and some such thin, leafy Expansions, which may be call'd primary Leaves, that serve to protect and draw Nourishment to the young Shoots and Leaf-buds, before the Leaf itself is expanded.

And herein we see the admirable Contrivance of the Author of Nature, in adapting her different Ways of conveying Nourishment to the different Circumstances of her Productions. For in this Embryo State of the Buds, a suitable Provision is made to bring Nourishment to them, in a Quantity that is sufficient for their then small Demands. But when they are in some Degree increased and formed, a much greater Quantity of Nourishment

ment is necessary, in proportion to their greater Increase: Nature, that she may no longer supply with a scanty Hand, immediately changes her Method, in order to convey Nourishment with a more liberal Hand to her Productions; which Supply daily increases by the greater Expansion of the Leaves, and consequently the more plentiful Attraction and Supply of Sap, as the greater Growth and Demand of it increases.

We find a much more elaborate and beautiful *Apparatus* for the like Purpose, in the curious Expansions of Blossoms and Flowers, which seem to be appointed by Nature, not only to protect, but also to draw and convey a Nourishment to the Embryo, Fruit, and Seeds. But as soon as the Calix is form'd into a small Fruit, now impregnated, with its minute seminal Tree, furnish'd with its *Secundine*, *Chorion*, and *Amnion* (which new-set Fruit may, in that State, be look'd upon as a compleat Egg of the Tree, yet in Embryo) then the Blossom falls off, leaving the new-form'd Egg, or first-set Fruit in this infant State, to imbibe Nourishment sufficient for itself and the *Fetus*, with which it is impregnated; which Nourishment is brought within the Reach and Power of its Suction by the adjoining Leaves.

If I may be allow'd to indulge Conjecture, (in a Case, in which the most diligent Inquirers are, as yet, after all their laudable Researches, advanced but little farther than mere Conjecture) I would propose it to their Consideration, whether from the manifest Proof we have, that Sulphur strongly attracts Air, a Hint may not be taken to consider, whether this may not be the primary Use of the *Farina Facundans*, to attract and unite with it self, elastick or other refin'd active Principles.

That this *Farina* abounds with Sulphur, and that a very refin'd Sort, is probable, from the subtil Oil, which Chymists obtain from the Chives of Saffron. And if this be the Use of it, was it possible that it could be more aptly placed for the Purpose on very moveable *Apices*, fixed on the slender Points of the *Stamina*, whereby it might easily, with the least Breath of Wind, be dispers'd in the Air thereby surrounding the Plant, as it were, with an Atmosphere of sublim'd sulphureous Pounce? for many Trees and Plants abound with it: They may be, perhaps, inspired at several Parts of the Plant, and especially at the *Pistillum*, and be thence convey'd to the *Capsula Seminalis*, especially towards the Evening; and in the Night, when the beautiful *Petala* of the Flowers are clos'd up, and they, with all the other Parts of the *Vegetable*, are in a strongly imbibing State.

And if to these united sulphureous and aerial Particles, we suppose some Particles of Light to be join'd, (for Sir Isaac Newton has found, that Sulphur attracts Light strongly) then the Result of these three, by far the most active Principles in Nature, will be a *Punctum Saliens* to invigorate the seminal Plant: And thus we are at last conducted, by the regular

Analysis of Vegetable Nature, to the first enlivening Principle of their minutest Origin.

VEGETATION, is the Act whereby Plants receive Nourishment, and grow: The Word is deriv'd from the Latin, *vegeto* to quicken, to refresh, to make lively and strong; and signifies the Way of Growth, or Increase of Bulk, Parts and Dimensions proper to all Trees, Shrubs, Plants, Herbs, Minerals, &c.

To understand the Process of Nature in the Business of *Vegetation*, it is to be consider'd, that there is in Vegetables a Principle of Life; and this is differently seated.

A certain Author says, Generally speaking, this Principle of Life is seated exactly between the Trunk and the Root; and this is observ'd to be the Place of its Position, in all or most of the Seminiferous Tribe: for if the *Oak* be included in that general Title, and the Body of it be cut down near that Place, it is odds if ever it shoots again, or at least to any Purpose.

In some Plants it is only the Roots; so that let them be cut into as many Pieces as reasonably may be, if these Pieces are but plant'd in the Ground, they quickly grow; as is seen in the *Elm*, &c. and in abundance of edible Roots and Flowers.

In some, it is seated both in the Roots, and all over the Trunk and Branches; as, in the *Vimineous* or *Willow* Kinds; which, if they be cut into a thousand Pieces, it is scarce possible to destroy or kill them, unless they are split in the Middle; and scarcely then: for if you plant them in the Earth but the Length of three or four Inches, either the Roots or Branches will certainly grow again.

In some, it is seated intirely in the Body, Branches, or Leaves; and of this Kind are many of the Exotick Plants, which being of a succulent Nature, if the Trunk or Branches, or the Leaves and Stems be put into the Ground, they will strike Root immediately, and grow; as in the *Cereus's*, *Ficoides's*, &c. nay, so strong is the Principle of Life in this Kind of Plants, that if they be hung up a considerable Time without any Earth, Water, &c. they will maintain their natural Verdure, and also this Principle of Life admirably, by their succulent Quality.

The Use of this Principle of Life, is accounted to be for the Concoction of the indigested Salts, which ascend through the Roots, where they are supposed to assimilate the Nature of the Tree they are helping to form; tho' perhaps the Root may likewise assist in the Work.

These Things being presuppos'd, in the Spring of the Year, as soon as the Sun begins to warm the Earth, and the Rains do melt the latent Salts, the whole Work of *Vegetation* is set on foot; then the emulgent Fibres seek for Food, which has been prepar'd as aforesaid.

It is very rational to suppose, that a great Part of the Roots are form'd under-ground during the *Winter* Season; because in all Lands there is always an innate Heat, which

seems to be a natural, vital Quality, or nitrous Fermentation.

The Roots, by seeking out and assuming those nitrous Salts, are immediately (by the Course of Nature, and the attractive Virtue of the Sun) drawn upwards to the vital Principle; and after Concoction, do ascend still higher into the Stem, and break out first in the Buds, the shelly and tenderest Part of the whole Machine, and afterwards diffuse themselves into the Leaves, Flowers, Fruits, &c. which lie envelop'd therein according to their natural Frames, &c.

There are some, which say there are three Kinds of Sap different from each other in Rarefaction and Purity, which ascend from the Root; from which are compos'd the Branches, Leaves, Flowers, and, consequent to them, the Fruit; and that they pass in different Channels.

But others again, suppose it is rather all of one Kind; and that it assumes its proper Office by an hidden Instinct in Nature, just as it enters the Boughs or Branches whereon the Fruit is to be; they being, by some casual Sprouts of the last Year, already form'd for that Purpose; or probably, that it is rarefy'd by the Passage through the Stem.

And tho' there are some that do suppose, that subterraneous Fires are concern'd in the Work of *Vegetation*, or the Growth of Plants; but as, upon the best Observation that hath been made, none can pretend to have discover'd any Heat or Fumigation to issue from the Surface or Bowels of the Earth, adequate to the meanest artificial Fire; it is plain, that the Sun is the Principle, and so may be call'd the Father of *Vegetation*, and the Earth the Mother; the Rain and Air being necessary Co-efficients in this surprizing Work. See the Articles *Sun, Earth, Air, Rain*.

Another Author tells us, That as in animal Bodies there are several Degrees of Juices, which are refin'd more or less, as the Vessels they pass through are larger or smaller, or perhaps according to their Figure; so also Plants are found to have Vessels of different Functions, which do, like Filtres of different Kinds, separate and alter the Juices which pass through them; so that they may be distinguish'd separately by the Senses, altho' they do all originally proceed from the same Fund of indigested Juice in the Root: And by how much these Juices have the more Time to open and nourish the several Parts they pass through; by so much, as well the Parts as the Juices, become more perfect, and approach nearer to the Point of Maturity, which is fix'd by Nature for their Perfection. In this Progress, those Parts which are to be acted upon, ripen equally, as those do that are to act.

It is apparent, by the Use of Microscopes, that Plants consist of different Parts, Vessels, &c. analogous to those of Animals: And each Kind of Vessel is suppos'd to be the Vehicle of a different Humour, or Juice, secreted from the Matter of the Sap; which is consider'd as the Blood or common Fund of them all.

Dr. Grew farther explains this, by saying, That all Kinds of *vegetable* Principles are at the first received together in a Plant, and are separated afterwards; i. e. they are filtred some from others, in very different Proportions and Conjunctions by the several Parts; so every Part is the Receptacle of a Liquor, become peculiar, not by any Transformation, but only by the Percolation of Parts out of the common Mass or Stock of Sap; and those that are superfluous in any Plant, are discharged back by Perspiration.

The same Author assigns the Offices of the several Vessels: He calls those Vessels *Lymphaducts*, which are placed on the inner Verge of the Bark; and these, he supposes, are appointed for the Conveyance of the most aqueous or watery Liquor.

Those Vessels that are in the Middle of the Plant, he calls *Lactiferous*, or *Refiniferous*; these he takes to be the principal *Viscera* of Plants; and that as the *Viscera* of Animals are but conglomerated Vessels, so the *Viscera* of Plants are Vessels drawn out at Length.

It is also remarkable in many Cases, That the Multitude and Largeness of the Vessels do produce a sweet and vinous Sap; and the Fewness and Smallness of the Vessels produce an oily and aromattick Sap.

It seems necessary, to the Nutrition of Plants, as well as Animals, that there be a Concurrence of two specifically distant Fluids: And a certain Author maintains, That there is an Intermixture of two such Humours in every Part of a Tree; every Part of Sap being impregnated with other Tinctures, and continually filtred from Fibres of one Kind to those of another; and from this Mixture many of the Phenomena of the Ripening, Odour, Colours, &c. are accounted for.

With regard particularly to the Odours in Plants, Dr. Grew is of Opinion, that they chiefly proceed from the Air-Vessels that are in the Wood; not but that the other Parts do also yield their Smells, which is most plain to be perceiv'd in Plants that are fresh, undry'd, and unbruised: For he says, that the Air bringing along with it a Tincture from the Root, and from the several organical Parts, and at last entering the Concave of the Air-Vessels, it consists there.

Another Writer says, That it cannot be deny'd, but the *Effluvia*, which can be admitted into the Wood-Vessels, may give a Smell to the Wood; but however, as that Vapour passes through Vessels which have a different Structure, so as to alter the Form of its Parts; so in every one of its Changes it will yield a Smell different from the rest; the Smell of the Wood will differ from that of the Bark, the Juices in the one being more essential than the other, but yet both being bruised and mixed together, yield a Scent different from either of them singly; and likewise the Leaves give a Scent that is different from either of the former; and so also do the Flowers from that in the Leaves, and also the Fruit from that in the Flowers.

Dr.

Dr. Grew is of Opinion, that the chief governing Principle in the Juice of Plants, is the *Saline*; which *saline* Principle, he says, must be understood as a *generick* Term, under which divers Species are comprehended. The *vegetable* Salts seem to be four, viz. the *nitrous* and the *acid*, *alkaline* and *marine*; and of these, the *nitrous* Salts seem to be assign'd by Nature chiefly for the Growth of Plants.

The curious *Malpighius* has very accurately deliver'd the Process of Nature in the *Vegetation* of Plants, to the Effect following.

The *Ovum* or Seed of the Plant being excluded out of the *Ovary*, (which is call'd the *Pod* or *Husk*) and requiring farther fostering and brooding, is committed to the Earth.

Where the Earth, like a kind Mother, having receiv'd it into her Bosom, does not only perform the Office of Incubation, by her own warm Vapours and Exhalations, in Conjunction with the Heat of the Sun, but gradually supplies what the Seed requires to its farther Growth, as abounding every where with Canals and Sinus's, in which the Dew and Rain-water, impregnated with fertil Salts, glide like the Chyle and Blood in the Arteries, &c. of Animals.

This Moisture meeting with the new deposited Seed, is percolated or strained through the Pores or Pipes of the outer Rind or Husk, (answering to the *Secundines* of *Fetus*'s); on the Inside whereof lie one or more, commonly two thick seminal Leaves (corresponding to the *Placenta* in Women, and the *Coryledons* in Brutes.)

These Seed-Leaves consist of a great Number of little *Vesiculæ* or Bladders, with a Tube corresponding to the Navel-strings in Animals.

The Moisture of the Earth strain'd through the Rind of the Seed is received into these *Vesiculæ*; which causes a slight Fermentation with the proper Juice before contain'd therein.

This fermented Liquor is convey'd by the Umbilical Vessel to the Trunk of the little Plant, and to the Gem or Bud which is contiguous to it; upon which a *Vegetation* and Increase of the Plant succeeds.

This Procedure in the *Vegetation* of Plants, the *forefaid* Author exemplifies in a Grain of *Wheat*, as follows.

The *first* Day the Grain is sown, it grows a little turgid, and the *Secundine* or Husk gapes a little in several Places; and the Body of the Plant being continued by the umbilical Vessel to a conglobated Leaf, (which is call'd the Pulp or *Flesh* of the Seed, and is what constitutes the Flower) swells; by which Means, not only the Gem or Sprout (which is to be the future Stem) opens and increases, but the Roots begin to bunch out: whence the *Placenta* or Seed-Leaf becoming loose, gapes.

The *second* Day, the *Secundine* or Husk being broken through, the Stem or Top of the future Straw appears on the Outside thereof, and grows upwards by degrees.

In the mean time, the Seed-Leaf, guarding the Roots, becomes turgid with its *Vesiculæ*, and puts forth a white Down, and the Leaf

being pull'd away, you see the Roots of the Plant bare; the future Bud, Leaves, and the rest of the Stalk still lying hid: Between the Roots and the ascending Stem, the Trunk of the Plant is knit by the Navel-knot to the Flower-Leaf; which is very moist, though it still retains its white Colour and its natural Taste.

The *third* Day, the Pulp of the conglobated or round Leaf becomes turgid with the Juice it has receiv'd from the Earth fermenting with its own.

Thus the Plant increases in Bigness, and in its Bud or Stem becomes taller, and from whitish turns greenish: The lateral Roots also break forth greenish and pyramidal, from the gaping Sheaf, which adheres closely to the Plant; and the lower Root grows longer and hairy, with many Fibres growing out of the same.

Indeed there are hairy Fibres hanging all along on all the Roots, except on the Tops; and these Fibres are seen to wind about the saline Particles of the Soil, little Lumps of Earth, &c. like *Ivy*, whence they grow curl'd: About the lateral Roots, there now break out two other little ones.

The *fourth* Day, the Stem mounting upwards, makes a right Angle with the seminal Leaf: The last Roots put forth more; and the other three growing larger, are cloathed with more Hairs, which straitly embrace the Lumps of Earth, and where they meet with any Vacuity, unite into a kind of Net-work: The Conglobate or Flower-Leaf is now softer, and when bruis'd, yields a white, sweetish Juice, like Barley-Cream. By stripping it off, the Root and Stem of the Plant are plainly seen with the intermediate Navel-knot, whose outer Part is solid, like a Bark, and the inner more soft and medullary.

The *fifth* Day, the Stalk still rising, puts forth a permanent or stable Leaf, which is green, and folded: The Roots grow longer, and there appears a new Tumour of a future Root: The Outer or Sheath is loosen'd, and the Seed-Leaf begins to fade.

The *sixth* Day, the Stable Leaf being loosen'd, the Plant mounts upwards, the Sheaf still cleaving round it like a Bark: The Seed-Leaf is now seen sinuous or wrinkled and faded; and this being freed or cut from the *Secundine*, the Flesh or *Pericarpium* is found of a different Texture: The outer Part, whereby the Outside of the Seed or Grain is heaved up, being more solid; but the Inside, viscular and full of Humour, especially that Part next the Navel-knot. All the Leaves being pulled off, the Roots torn, and the Flower-Leaf remov'd, the Trunk appears; wherein, not far from the Roots, the Navel-knot bunches out, which is solid, and hard to cut: Above there is the Mark of the Sheath-Leaf, which was pulled off; and underneath, as in an Arm-pit, the Gem is often hid: The hind Part of the Plant shews the breaking forth of the Roots likewise, with the faded *Placenta*, &c.

After the *eleventh* Day, the Seed-Leaf, as yet sticking to the Plant, is crumpled, and almost

almost corrupted; within, it is hollow; and about the *Secundine*, the mucous and white Substance of the Seed being continued to the Navel-knot, forms a Cavity: All the Roots becoming longer, put forth new Branches out of their Sides. The second Leaf withers, and its Vesicles are emptied: The Internodes or Spaces between the Knots grow longer; new Gems appear, and the middle Root grows several Inches long.

After a Month, the Roots and Stalk being grown much longer, new Buds break out at the first Knot, and little Tumours bunch out, which, at length, break into Roots.

As to the *vegetable Matter*, or the Food where the Plants grow, there is some Doubt: It hath been a general Opinion amongst almost all the modern Naturalists, That the *Vegetation* of Plants, and even of Minerals too, is principally owing to Water, which not only serves as a Vehicle to convey to them the fine rich Earth, &c. proper for their Nourishment, but being transmuted into the Body of the Plant, affords the greatest Part, if not all the Matter with which they are nourish'd, and by which they grow and increase in Bigness. This Opinion is countenanc'd by very great Names; particularly the ingenious Dr. Woodward, who in order to ascertain this Point, made the following Experiments.

In the first Place he carefully examined all Sorts of Water, and found, that the clearest, finest Spring Water, which he could any where meet with, exhibited even to the naked Eye, great Numbers of exceeding small terrestrial Particles, and that all other Crasser Waters had these in yet much greater Quantity; and also that they were of a larger Bulk.

He found this terrestrial Matter contain'd in all Water to be of two kinds: The one properly a *vegetable Matter*, but consisting of very different Particles; some of which are very proper for the Nourishment of some kinds of Plants; others for different Sorts, &c. The other kind of earthy Matter he found to be purely of a mineral Nature; and this also was of very various and different Kinds.

The former Sort of *vegetable* earthy Matter, abounds plentifully in all Waters; but for the Mineral, it is found mostly in Spring-Water; next to that in River-Water; and least of all in Rain-Water: tho' even there also it is to be found plentifully.

This Fact, he says, any one may discover, by only keeping Water for a competent Time without stirring it, in a clear Glass Phial, closely stopp'd, to keep out Dust, &c. for then he will observe, that these very small terrestrial Particles which before were scarcely visible singly, will now combine together into large and more conspicuous Masses, which, by degrees, will join together, and form Clouds, as it were, in the Water, which will grow daily more and more opacous and thick by the continual Accession of new Matter; and if the earthy Matter in the Water be chiefly of the *vegetable* Kind, it will turn the Water green, the usual Colour of *Vegetables*; and this will grow deeper and deeper colour'd, but will not

precipitate to the Bottom of the Glass, as the Mineral Water will, if there be any considerable Quantity, by reason of its much greater specifick Gravity. On the Whole therefore he concludes very justly, That there is in all Water a considerable Quantity of the earthy Matter; and in order to determine whether the *Vegetation* of Plants was chiefly owing to bare Water or not, rather than to the *terrestrial Matter* therein contain'd, he made, with very great Accuracy and Care, several Experiments.

Which Experiments, because they were done with an uncommon Care and Exactness; are a sufficient Number of them; and are follow'd by very ingenious *Reflections*, serving to explicate many Difficulties of Philosophy, and to set the whole Affair of *Vegetation* in a very good Light; I shall give the Register as follows.

Anno Dom. 1691, he chose several Glass Phials that were all as near as possible of the same Shape and Bigness. After he had put what Water he thought fit into every one of them, and taken an Account of the *Weight* of it, he strain'd and ty'd over the Orifice of each Phial a Piece of Parchment, having Holes in the Middle of it large enough to admit the Stem of the Plant he design'd to set into the Phial, without confining or straitening it so as to impede its Growth. His Intention in this was to prevent the inclos'd Water from evaporating or ascending any other Way than only through the Plant to be set therein.

Then he made Choice of several Sprigs of *Mint* and other Plants that were, as near as he could possibly judge, alike sound, fresh and lively: Having taken the Weight of each, he placed it in a Phial, order'd as above; and as the Plant imbib'd and drew off the Water, he took Care to add more of the same from time to time, keeping an Account of the Weight of all he added. Each of the Glasses were, for better Distinction, and the more easy keeping a Register of all the Circumstances, noted with a different Mark or Letter, as A, B, C, &c. and all set in a Row in the same Window, in such manner that all might partake alike of Air, Light, and Sun.

Then they continu'd from July 20th to October the 5th, which is just 77 Days, when he took them out, weighed the Water in each Phial, and the Plant likewise, adding to its Weight that of all the Leaves that had fallen off, during the Time it had stood thus: And lastly, he computed how much each Plant had gain'd, and how much Water was spent upon it.

The Particulars are as follow.

The Plant weigh'd, when put in, July the 20th, just 27 Grains; When taken out, October the 5th, 42 Grains. So that in the Space of 77 Days, it had gain'd in Weight 15 Grains.

The whole Quantity of Water expended during the 77 Days, amounts to 2558 Grains. Consequently the Weight of the Water taken up 170 $\frac{2}{3}$ times the Grains as much as the Plant had gain'd in Weight.

This

This will be made plainer by the following TABLES.

Weight of the Plant when first put into Water.	Weight of the Plant when taken out of the Water.	Weight gain'd by the Plant during the 77 Days.	Weight of the Water expended upon the Plant.	Proportion of the Increase of the Plant to the Expence of the Water.
		A		
		<i>Common Spear Mint,</i>	<i>Spring Water.</i>	
27 Grains.	42 Grains.	15 Grains.	2558 Grains.	as 1 to 170 $\frac{2}{17}$.
		B		
		<i>Common Spear Mint,</i>	<i>Rain Water.</i>	
28 $\frac{1}{4}$ Grains.	45 $\frac{3}{4}$ Grains.	17 $\frac{1}{2}$ Grains.	3004 Grains.	as 1 to 171 $\frac{23}{31}$.
		C		
		<i>Common Spear Mint,</i>	<i>Thames Water.</i>	
28 Grains.	54 Grains.	26 Grains.	2493 Grains.	as 1 to 95 $\frac{23}{26}$.
		D		
		<i>Common Solanum or Nightshade,</i>	<i>Spring Water.</i>	
49 Grains.	106 Grains.	57 Grains.	3708 Grains.	as 1 to 65 $\frac{3}{17}$.
		E		
		<i>Latbyrus seu Cataputia</i>	<i>Ger. Spring Water.</i>	
98 Grains.	101 $\frac{1}{2}$ Grains.	3 $\frac{1}{2}$ Grains.	2501 Grains.	as 1 to 714 $\frac{1}{7}$.

The Specimen D had several Buds upon it, when first set into the Water; these, in some Days, became fair *Flowers*, which were, at length, succeeded by *Berries*. Several other Plants were try'd, which did not thrive in Water, nor succeed any better than the *Cataputia* foregoing.

The Phyls F and G were fill'd, the former with *Rain*, and the other with *Spring-Water*, at the same time as those abovemention'd were, and stood as long as they did; but they had neither of them any Plant: The Design of which was, in order to learn, whether any Water exhal'd out of the Glasses, otherwise than through the Bodies of the Plants.

The Orifices of these two Glasses were cover'd with Parchment, each Piece of it being perforated with a Hole of the same Bigness with those of the Phyls above. In these was suspended a Bit of Stick about the Thickness of the Stem of one of the aforesaid Plants, but not reaching down to the Surface of the inclos'd Water, that the Water in these might not have more Scope to evaporate than that in the other Phyls.

Thus they stood the whole 77 Days with the rest, when, upon Examination, none of the Water was found to be waisted or gone off; tho' he observ'd, both in these and the rest, especially after very hot Weather, small Drops

of Water, not unlike to Dew, adhering to the Insides of the Glasses, i. e. that Part of them that was above the Surface of the inclos'd Water.

The Water in these two Glasses that had no Plants in them, at the End of the Experiment exhibited a larger Quantity of terrestrial Matter than that in any of those that had the Plants in them did.

The Sediment in the Bottom of the Phyls was greater, and the *Nubiculæ* diffus'd through the Body of the Water thicker: And of that which was in the others, some of it proceeded from certain small Leaves that had fallen from that Part of the Stem of the Plants that was within the Water, wherein they rotted and dissolv'd.

The Terrestrial Matter in the *Rain-Water* was finer than that of the *Spring-Water*.

Experiments, Anno 1692.

The Glasses made use of in this were of the same Sort with those of the former Experiment, and cover'd over with Parchment after the same manner.

The Plants here were all *Spear Mint*, the most kindly, fresh, sprightly Shoots he could choose. The Water and Plants were weighed, as above, and the Phyls set in a Line in a South Window,

where they stood from June 2, to July 28, which was just 56 Days.

The Plant H was all along a very kindly one, and run up about two Feet in Height. It had shot but one considerable collateral Branch, but had sent forth many and long Roots; from which sprung very numerous, though small and short lesser Fibres. The lesser Roots came out of the larger on two opposite Sides for the most part; so that each Root, with its *Fibrillæ* appears not unlike a small Feather. To these *Fibrillæ* adhered pretty much *terrestrial Matter*:

In the Water, which is at last thick and turbid, was a green Substance, resembling a fine, thin *Conferva*.

The Plant [I] was as kindly as the former, but had shot no collateral Branches: Its *Roots*, the *Waters*, and the green Substance, all much as in the former.

The Plant K, though it had the Misfortune to be annoy'd with very small Insects that happen'd to fix upon it, yet had shot very considerable collateral Branches, and at least as many Roots as either H or I, which had a

Weight of the Plant when first set in Water.	Weight of the Plant when taken out of the Water.	Weight gain'd by the Plant when it had stood 56 Days.	What of the Water is expended upon the Plant.	Proportion of Increase of the Plant to the Expence of the Water.
127 Grains.	Hyde Park 255 Grains.	H Conduit Water 128 Grains.	alone. 14190 Grains.	as 1 to 110 $\frac{110}{113}$
110 Grains.	The 249 Grains.	I same Water 139 Grains.	alone. 13140 Grains.	as 1 to 94 $\frac{94}{139}$
The same Water, 76 Grains.	with an Ounce and half of 244 Grains.	K common 168 Grains.	Garden Earth 10731 Grains.	dissolved in it. as 1 to 63 $\frac{147}{168}$
92 Grains.	Hyde Park Water, with the 376 Grains.	L same Quantity of 284 Grains.	Garden Mould as 14950 Grains.	the former. as 1 to 52 $\frac{182}{284}$
114 Grains.	Hyde Park Water 155 Grains.	M distill'd with a 41 Grains.	gentle Still. 8803 Grains.	as 1 to 214 $\frac{29}{41}$
The Residue of 81 Grains.	the Water which remained in the Still 175 Grains.	N after that in M 94 Grains.	was distill'd off. 4344 Grains.	as 1 to 46 $\frac{39}{94}$

much greater Quantity of *terrestrial Matter* adhering to the Extremities of them. The same green Substance here that was in the two preceding.

The Plant L was far more flourishing than any of the preceding, had several considerable collateral Branches and very numerous Roots, to which *terrestrial Matter* adhered very copiously.

The Earth in both these Glasses was very sensibly and considerably wasted, and less than when first put in. The same Sort of green Substance here as in those above.

The Plant M was pretty kindly; had two small collateral Branches, and several Roots, though not so many as those in H or I; but as

much *terrestrial Matter* adhering to them as those had: The Water was pretty thick, having very numerous small *terrestrial Particles* swimming in it, and some Sediment at the Bottom of the Glass. This Glass had none of the green Matter above-mention'd in it.

The Plant N was very lively, and had sent out six collateral Branches, and many Roots; but the Water was very turbid, and as high-coloured as ordinary Beer.

The Glass O had also *Hyde Park Conduit-Water*, in which was dissolv'd a Dram of *Nitre*. The *Mint* set in this, suddenly began to wither and decay, and died in a few Days; as likewise did two more Sprigs that were set in it successively. In another Glass, he dissolv'd an

Ounce

Ounce of good Garden Mould, and a Dram of Nitre; and in a third, half an Ounce of Wood-ashes, and a Dram of Nitre: But the Plants in these succeeded no better than the former. In other Glasses, he dissolv'd several other Sorts of Earth, Clay, Marles, and variety of Manures, &c. and he set *Mint* in distill'd *Mint-Water*, and made other Experiments of several kinds, in order to get a Light and Information what hastened or retarded, promoted or impeded *Vegetation*.

The Glass P *Hyde Park Conduit-Water*. In this he fix'd a Glass Tube ten Inches long, the Bore one-sixth of an Inch diameter, fill'd with very fine and white Sand, which he kept from falling down out of the Tube into the Phyal, by tying a fine Piece of Silk over that End of the Tube that was downwards. Upon Immersion of the lower End of it into the Water, this by little and little ascended quite up to the Orifice of the Tube; and yet in all the 56 Days that it stood thus, a very inconsiderable Quantity of Water had gone off, viz. scarcely 20 Grains, though the Sand continued moist up to the Top till the very last.

The Water had imparted a green Tincture to the Sand quite to the very Top of the Tube: And in the Phyal, it had precipitated a greenish Sediment, mix'd with Black. To the Bottom and Sides of the Tube, as far as it was immers'd in the Water, adhered pretty much of the green Substance describ'd above.

Other like Tubes he fill'd with *Cotton*, *Lint*, *Pith of Elder*, and several other porous vegetable Substances; setting some of them in clear Water, others in Water tinged with *Saffron*, *Cochineal*, &c. and several other Trials were made, in order to give a mechanical Representation of the Motion, and Distribution of the Juices in Plants, and of some other Phenomena observable in *Vegetation*.

Several Plants being also set in the Phials Q. R. S. &c. order'd in like manner as those above in *October*, and the following colder Months; these thrive not near so much, nor did the Water ascend nigh the Quantity it did in the hotter Seasons, in which the before-cited Trials were made.

The Result of all which Experiments, he gives us in the following Observations and Reflections.

I. In Plants of the same kind, the less they are in Bulk, the smaller Quantity of the fluid Mass, in which they are set, is drawn off; the Consumption, where the Mass is of equal Thickness, being pretty nearly proportion'd to the Bulk of the Plant.

In effect, the Water seems to ascend up the Vessels of the Plants, in much the same manner as up a Filtre; and it is not to be wonder'd at, that the larger Filtre should draw off more Water than the smaller; or that a Plant that hath more or larger Vessels, should take up a greater Part of the Fluid in which it is set, than one that has fewer can: Nor is it thus noted as a thing very considerable in it self, but chiefly with regard to what follows.

II. Much the greater Part of the fluid Mass, thus drawn off, and convey'd into the Plant, does not settle or abide there, but passes through their Pores, and exhales up into the Atmosphere.

That the Water in these Experiments, ascended only through the Vessels of the Plants, is certain; since some Glasses which had no Plants in them, though dispos'd in the like manner as the rest, did remain at the End of the Experiment as at first, and without any Diminution of Water; and that the greatest Part of it flies off from the Plant into the Atmosphere, is as certain.

The least Proportion of the Water expended, was to the Augment of the Plant, as 46 or 50 to 1; and in some 100,200 in 1, as 700 to 1.

Thus so continual an Emission of Water, in so great Plenty from the Parts of the Plant, affords a manifest Reason, why Countries that abound with Trees and the larger Vegetables especially, should be very obnoxious to Damps, great Humidity in the Air, and more frequent Rains than others that are more open and free.

The great Moisture of the Air was a great Inconvenience and Annoyance to those who first settled in *America*; which at that Time was over-grown with Woods and Groves: But as these were burnt down and destroy'd, to make Way for Habitations and Culture of the Earth, the Air mending, changed into a Temperature more serene and dry than before.

Nor does this Humidity go off pure and alone, but usually carries with it many Parts of the same Nature with those whereof the Plant consists: The Crasser, indeed, are not so easily borne up into the Atmosphere, but are usually deposited on the Surface of the Leaves, Flowers, and other Parts of the Plants; whence proceed our *Manna's*, our *Honey's*, and other gummous Exudations of Vegetables: But the finer and lighter Parts are with greater Ease sent up into the Atmosphere; thence they are convey'd to our Organs of Smelling, by the Air we draw in Respiration; and are pleasant or offensive, beneficent or injurious to us, according to the Nature of the Plants from whence they arise. And since these owe their Rise to the Water that ascends out of the Earth through the Bodies of Plants, we cannot be far to seek for the Cause why they are more numerous in the Air, and a greater Quantity of Odours is found exhaling from Vegetables in warm, humid Seasons than in any other.

III. A great Part of the Terrestrial Matter that is mix'd with Water ascends up into the Plant, as well as the Water.

There was much more terrestrial Matter at the End of the Experiment, in the Water of the Glasses that had no Plants in them, than in those that had Plants. The Garden Mould dissolved in some of the Glasses was considerably diminish'd and carry'd off; nay, the terrestrial and vegetable Matter was borne up in the Tubes fill'd with Sand, Cotton, &c. in that

that Quantity, as to be evident even to Sense; and the Bodies in the Cavities of the other Tubes, that had their lower Ends immers'd in Water, wherein Saffron, Cochineal, &c. had been infus'd, were ting'd with Yellow, Purple, &c.

To look abroad a little towards our Shores and Parts within the Verge of the Sea, these will present us with a large Scene of Plants, that, along with the *vegetable*, take up into them more mineral Matter also, in great abundance; such as our *Sea-Purslain*, several Sorts of *Algas*, of *Sampfires*, and other Marine Plants: Those contain common Sea Salts, which are the same as the Fossil, in such Plenty, as not only plainly to be distinguished in the Palate, but may be drawn out of them in considerable Quantity: Nay, some affirm, there are Plants found, that will yield Nitre, and other Mineral Salts.

The *vegetable* Matter being very fine and light, is surprizingly apt and dispos'd to attend Water in all its Motions, and follow it into each of its Recesses; as appears not only from the Instances above alledg'd, but many others: Percolate it with all the Care imaginable, filtre it with ever so many Filtrations, yet some terrestrial Matter will remain.

Dr. Woodward has filter'd Water through several Sheets of thick Paper, and after that, through very close, fine Cloth, twelve times double, and this over and over, and yet a considerable Quantity of this Matter discovered it self in the Water after all.

Now, if it thus passes Interstices that are so very small and fine, along with the Water, it is less strange it should attend it in its Passage through the Ducts and Passages of Plants. It is true, filtering and distilling of Water interrupts, and makes it quit some of the earthy Matter it was before impregnated withal; but then that which continues with the Water after this, is fine and light, and such, consequently, as is in a peculiar manner fit for the Growth and Nourishment of *Vegetables*.

And this is the Case of Rain-water: The Quantity of terrestrial Matter it bears up into the Atmosphere is not great; but what it doth bear up is chiefly of that light Kind, or *vegetable* Matter, and that too perfectly dissolved, and reduc'd to single Corpuscles, all fit to enter the Tubes and Vessels of Plants; on which account it is, that this Water is so very fertil and prolifick.

The Reason why all the terrestrial Matter mixed with the Water does not ascend into that, is, that the mineral Matter makes a great deal of it, which is not only gross and ponderous, but scabrous and inflexible, and so not dispos'd to enter the Pores of the Roots; besides, a great many of the simple *vegetable* Particles, do, by Degrees, unite and form small Cl ds, or *Molecules*, which stick to the Extremities of the Roots of those Plants, and others of them, entangled in a looser Manner, from the *Nubicle*, or green Bodies, so commonly observ'd in stagnant Water: These, when thus conjoin'd, are too big to enter the

Pores, or ascend up the Vessels of Plants, which, singly, they might have done.

Hence it is, that in Agriculture, be the Earth never so rich, good, and fit for the Production of Corn, or other *Vegetables*, little will come of it, unless the Particles be separated and loose; and 'tis on this account such Pains are bestowed in the digging, tilling, ploughing, fallowing, harrowing, and breaking the clodded Lumps of Earth: And 'tis the same Way that Sea Salt, Nitre, and other Salts promote *Vegetation*.

Some Authors imagine Nitre essential to Plants, and that nothing in the *vegetable* Kingdom is transacted without it; but Dr. Woodward says, by all the Trials he has been able to make, the thing seems to him quite otherwise; and when contiguous to the Plant, Nitre rather destroys than nourishes it.

But Nitre and other Salts do certainly loosen the Earth, and separate the concreted Parts of it; by that Means fitting and disposing them to be assum'd by the Water, and carried up into the Seed or Plant for its Formation and Increase.

It is evident to Observation, how apt all Sorts of Salts are to be wrought upon by Moisture, how easily they run with it; and when these are drawn off, and have deserted the Lumps with which they are incorporated, these must moulder immediately, and fall asunder in course.

The hardest Stone that is to be met with, if it happens, as it frequently does, to have any Salt intermix'd with the Sand of which it consists, upon its being expos'd to a humid Air, in a short time dissolves and crumbles all to pieces; and much more will clodded Earth or Clay, which is not of so compact and solid a Constitution.

Lime likewise is in the same Way serviceable in this Affair. The Husbandmen say, it does not fatten, but only mellows the Ground; by which they mean, it doth not contain any thing in it self, that is of the same Nature with the *vegetable* Mould, or afford any Matter fit for the Formation of Plants, but merely softens and relaxes the Earth; by that Means rendering it more capable of entering the Seeds and *Vegetables* set in it, in order to their Nourishment, than otherwise it would have been.

The Properties of Lime are well known, and how apt it is to be put in a Ferment and Commotion by Water; nor can such Commotion ever happen, when Lime is mix'd with Earth, however hard and clodded it may be, without opening and loosening it.

IV. The Plant is more or less nourished, in Proportion as the Water in which it stands, contains a greater or smaller Quantity of proper terrestrial Matter in it.

The Truth of this Proposition is discernible through the whole Process of the Doctor's Experiments. The Mint in one of the Glasses was of much the same Bulk and Weight with that of

of two or three others; but the Water in which the first was, being River Water, which was apparently more copiously stor'd with terrestrial Matter, than the Spring or Rain Water, in which the other stood, occasioned it to arrive at almost double the Bulk that either of them had, and with a less Expence of Water too.

So likewise the Mint in another Glass, in the Water of which was dissolv'd a small Quantity of good Garden Mould; tho' it had the Disadvantage to be less, when first set, than either of the Mints in the two other Glasses, the Water in which was the very same as the first, only had none of the Earth mix'd with it, yet, in a short time, the Plant not only overtook, but much out-stripp'd the other.

The Reason why the Proportion of the Increase of the Plant was limited to the Quantity of proper terrestrial Matter in the Water, is, that all, even *vegetable* Matter, is not proper for the Nourishment of every Plant: Nor do there want good Indications, that every Kind requires a peculiar and specifick Matter for its Formation and Nourishment; yea, each Part of the same *Vegetable*: And that there are very many, and different Ingredients, to go to the Composition of the same individual Plant.

If, therefore, the Soil wherein any *Vegetable* or Seed is planted, contains all, or most of these Ingredients, and those in due Quantity, it will grow and thrive, otherwise it will not: If there be not as many Sorts of Corpuscles, as are requisite for the Constitution of the main and more essential Parts of the Plant, it will not prosper at all; if there are these, and not in sufficient Plenty, it will never arrive to its natural Stature: Or if any of the less necessary and essential Corpuscles are wanting, there will be some Failure in the Plant; it will be defective in Smell, Taste, Colour, or some other Way.

Indeed it is inconceivable, how one uniform, homogeneous Matter, having its Principles or original Parts of the same Substance, Constitution, Magnitude, Figure, and Gravity, should constitute Bodies so unlike, in all those respects, as *Vegetables* of different Kinds are; nay, even as the different Parts of the same *Vegetable*: That one should carry a resinous, another a milky, a third a yellow, a fourth a red Juice in its Veins; that one affords a fragrant, another an offensive Smell; one sweet to the Taste, another acid, bitter, acerb, austere, &c. that one should be nourishing, another poisonous; one purging, another astringent.

And this Argument makes equally strong against those who suppose mere Water the Matter out of which all Matters are formed.

A *Cataputia* in one of the Glasses afforded but a little Increase, only $3\frac{1}{2}$ Grains all the while, tho' 2501 Grains of Water were spent upon it: But this might possibly be owing not to the Water's wanting Matter fit for the Nourishment of that particular Plant, but from its being an improper *Medium* for that to grow in. Too much of that Liquor, in

some Plants, may, probably, hurry the terrestrial Matter through the Vessels too fast for them to lay hold of it.

But a farther Proof of this Matter is, that the Soil once proper for the Production of some Sort of *Vegetables* does not ever continue so, but in Tract of Time loses its Property; and sooner in some Lands, and later in others.

As for Example; If *Wheat* be sown upon Land proper for that Grain, the first Crop will succeed very well, and perhaps the second and third, as long as the Ground is in Heart, as the Farmers call it; but in a few Years it will produce no more, if sow'd with that Corn; some other Grain it may, as *Barley*: And after this has been sown so oft, that the Land can bring no more of it, it may afterwards yield some good *Oats*, and perhaps *Peas* after them.

At length it becomes barren, the *vegetative* Matter that at first it abounded with, being reduc'd by the successive Crops, and most of it borne off, each Sort of Grain takes out that peculiar Matter that is proper for its own Nourishment.

It may be brought to bear another Series of the same *Vegetables*; but not till it is supplied with another Fund of Matter of the like Sort with what it first contain'd, either by the Ground's lying fallow for some time, till the Rain hath poured a fresh Stock upon it, or by the manuring it.

That this Supply is of the like Sort, is evident, by the several Manures found best to promote the *Vegetation*; which are chiefly either of Parts of *Vegetables*, or of Animals; of Animals, which either derive their own Nourishment immediately from *vegetable* Bodies, or from other Animals that do so; in particular, the Blood, Excrements and Urine of Animals, that do so; Shaving of Horns and Hoofs, Hair, Feathers, calcin'd Shells, Lees of Wine and Beer, Ashes of all Sorts of *vegetable* Bodies, Leaves, Straw, Roots, and Stubble, turn'd into Earth by ploughing or otherwise, to rot and dissolve there.

These are our best Manures, and being *vegetable* Substances, when refunded back again into the Earth, serve for the Formation of other Bodies.

But to apply this to Gardens, where the Trees, Shrubs and Herbs, after their having continued in one Station, till they have derived thence the greatest Part of the Matter fit for their Increase, will decay and degenerate, unless either fresh Earth, or some fit Manure be apply'd to them.

It is true, they may maintain themselves there for some time, by sending forth Roots farther and farther, to an Extent all around, to fetch in more Provision; but at last they must have a fresh Supply brought to them, or they themselves removed or transplanted to some Place better furnished with Matter for their Subsistence. And accordingly Gardeners observe, that Plants that have stood a long while in a Place, have longer Roots than usual; part of which they cut off, when they transplant to a fresh Soil, as not now of any farther use to them.

All these Instances argue a particular terrestrial Matter, and not Water, for the Subject to which Plants owe their Increase: Were it Water only, there would be no need of Manures, or Transplanting; the Rain falls in all Places, in this Field and in that, indifferently, on one Side of an Orchard or Garden as well as the other; nor could there be any Reason why a Tract of Land should yield *Wheat* one Year, and not the next, since the Rain showers down all alike upon the Earth.

V. *Vegetables are not form'd of Water, but of a certain peculiar terrestrial Matter.*

It has been shewn, that there is a considerable Quantity of this Matter contain'd both in Spring, Rain, and River-water, and the Experiments before-mentioned shew, that the much greatest Part of the fluid Mass, that ascends up into Plants, does not settle or abide there, but passes through the Pores of them, and exhales into the Atmosphere, and that a great Part of the terrestrial Matter, mixed with the Water, passes up into the Plant along with it, and that the Plant is more or less augmented, in Proportion as the Water contains a greater or lesser Quantity of Matter: From all which we may reasonably infer, that Earth, and not Water, is the Matter which constitutes *Vegetables*.

One of the Sprigs of Mint before-mention'd drew up into it 2501 Grains of the fluid Mass, and yet had received but $3\frac{1}{2}$ Grains of Increase from it.

A *second*, tho' it had at first the Disadvantage to be much less than a *third*, yet being set in Water, wherein Earth had been plentifully mix'd, and the other in Water without any such Earth, it had vastly out-grown it, weighing at least 145 Grains more than that did.

A *fourth* Plant, tho' at first a great deal less than the *fifth*, yet being set in foul, crass Water, that was left in the Still, after that in which the last was set was drawn off, had gain'd in Weight, at the End, above double what that in the finer and thinner Water had.

The Proportion of the Augment of that Plant, which thrived most, was in the said Mass spent upon it, but as 1 to 46, in others as one to 60, 100, 200, and in the *Cataputia*, but as 1 to 714.

One of the Sprigs took up 39 Grains of Water a Day, one Day with another, which was much more than the whole Plant originally, and yet it gain'd not $\frac{1}{4}$ of a Grain a Day in Weight.

And another took up 253 Grains a Day, which was near twice as much as its original Weight, and after all, the daily Increase of the Plant was no more than $2\frac{1}{36}$ Grains.

VI. *Spring and Rain-water contain near an equal Charge of vegetable Matter; River-water more than either of them.*

These Proportions hold in the main; but a strict and just Composition is hardly to be expected; inasmuch as, in all Probability, the Water that falls in Rain contains some-

times a greater Share of terrestrial Matter, than that which falls at other times; a more powerful and intense Heat, of Necessity, hurrying up a larger Quantity of that Matter, along with the humid Vapours that form Rain, than one more feeble and remiss possibly can.

The Water of one Spring may flow forth with an higher Charge of this Matter than that of another: This depending partly upon the Quickness of the Ebullition of the Water, and partly on the Quantity of that Matter latent in the *Strata*, thro' which the Fluid passes, and the greater or less Laxity of those *Strata*: For the same Reason the Water of one River may abound with it more than that of another; nay, the same River, when much agitated and in Commotion, must bear up more of it than when it moves with less Rapidity and Violence. That there is a great Quantity of ordinary Fertility of the Earth, the *Nile* affords a pregnant Instance, and so does the *Ganges* and other Rivers, which annually overflowing the neighbouring Plains, their Banks shew the fairest and largest Crops of any in the World.

VII. *Water serves only for a Vehicle to the terrestrial Matter which forms Vegetables, and does not itself make any Augmentation to them.*

Where the proper terrestrial Matter is wanting, the Plant is not augmented, tho' never so much Water ascend into it: Water then is not the Matter that composes *vegetable* Bodies, it is only the Agent that conveys the Matter into them, that distributes it to their several Parts to their Nourishment; that Matter is sluggish and unactive, and would lie eternally confin'd to its Beds of Earth, without advancing up into Plants, did not Water, or some like Instrument, fetch it forth, and carry it into them.

This Fluid is capacitated several Ways for the Office here assign'd it, by the Figure of its Parts, which appears from many Experiments to be exactly and mathematically spherical, their Surfaces being perfectly polite, and without any the least Irregularities.

It is evident, that Corpuscles of such a Figure are easily susceptible of Motion, and far above any others whatever, and consequently more capable of moving and conveying other Matter that is not so active; then the Intervals of the Bodies of that Figure are, in respect to their Bulk, of all others the largest, and so the most fitted to receive and entertain foreign Matter in them: Besides, as far as the Trials hitherto made inform us, the constituent Corpuscles of Water are each singly consider'd absolutely solid, and do not yield to the greatest external Force: This secures their Figure against any Alteration, and the Intervals of their Corpuscles must be always alike.

By the latter, it will ever be dispos'd to receive Matter into it; and by the former, when once receiv'd, to bear it along with it. Water is farther capacitated to be a Vehicle to this Matter, by the Tenuity and Fineness of the Corpuscles of which it consists. We

hardly

hardly know any Fluid in all Nature, except Fire, whose constituent Parts are so exceeding subtil and small as those of Water are; they will pass Pores and Interstices, that neither Air nor any other Fluid will. This enables them to enter the Tubes, and finest Vessels of Plants, and to introduce the terrestrial Matter, and convey it to all Parts of them, whilst each, by means of Organs it is endu'd with for that Purpose, intercepts and assumes into itself such Particles as are suitable to its own Nature, letting the rest pass on through the common Ducts.

VIII. *Water is not capable of performing this Office to Plants, unless assisted by a due Quantity of Heat.*

Heat must concur, or *Vegetation* will not succeed. The Plants set in the Glasses in *October*, and the following Months, had not near the Quantity of Water sent up into them, or so great an additional Increase by much, as those that were set in *June, July*, or the hotter Months.

It is plain the Water has no Power of moving itself, or rising to the vast Height it doth in the more tall and lofty Plants; so far from it, that it doth not appear, by any Discovery yet made, that even its own Fluidity consists in the intestine Motion of its Parts, whatever the *Cartesians* think.

Indeed we want nothing more to solve all the *Phænomena* of Fluidity, than such a Figure and Disposition of Parts as Water has; spherical Corpuscles must stand so ticklish upon each other, as to be susceptible of every Impression, and though not perpetually in Motion, must be always ready and liable to be put into it by any the slightest Force imaginable: 'Tis true, the Parts of Fire or Heat are not capable of moving themselves any more than those of Water; but they are more subtil, light, and active than those are, and so the more easily put in Motion.

That the Concourse of Heat is really necessary in this Work, appears not only from the Experiments before us, but from all Nature; from the Fields and Forests, Gardens and Orchards: We see in *Autumn*, as the Sun's Power is gradually less and less, so its Effects on Plants is remitted, and *Vegetation* slackens by little and little.

Its Failure is first discernable in Trees; which being raised highest above the Earth, require a more intense Heat to elevate the Water charged with Nourishment to their Tops; so that for want of fresh Support and Nutriment, they shed their Leaves, unless supported by a very firm and hard Constitution indeed, as our *Ever-greens* are. Next, the Shrubs part with theirs; then the Herbs and lower Tribes: The Heat, at length, not being sufficient to supply even to these, tho' so near the Earth, the Fund of their Nourishment.

As the Heat returns the succeeding *Spring*, they all recruit again, and are furnish'd with fresh Supplies and Verdure: But first, those

which are lowest and nearest the Earth, and that require a lesser Degree of Heat to raise the Water with its earthy Charge into them: Then the Shrubs and higher *Vegetables* in their Turn; and lastly, the Trees.

As the Heat increases, it grows too powerful, and hurries the Matter with too great Rapidity through the finer and more tender Plants: These therefore go off and decay; and others that are more hardy and vigorous, and require a greater Degree of Heat, succeed in their Order. By which Mechanism, provident Nature furnishes us with a very various and different Entertainment, and what is best suited to each Season all the Year round.

As the Heat of the several Seasons affords us a different Face of Things, so the several distant Climates shew the different Scenes of Nature and Productions of the Earth.

The hotter Countries ordinarily yield the largest and tallest Trees, and those too in a much greater Variety than the colder: Even those Plants common to both, attain to a much greater Bulk in the Southern than in the Northern Climates.

Nay, there are some Regions so cold, that they raise no *Vegetables* at all to a considerable Size: This we learn from *Greenland, Iceland*, and other Parts of like cold Situation and Condition: In these there are no Trees, and the Shrubs are poor, little and low.

Again, in the warmer Climates, and such as do furnish Trees, and the large *Vegetables*, if there happen a Remission or a Diminution of the usual Heat, their Productions are impeded in Proportion. Our cold Summers give us Proof enough of this; for tho' at such times there is Heat sufficient to raise the *vegetative* Matter into the lower Plants, as *Wheat, Barley, Peas*, and the like; and we have Plenty of *Strawberries, Raspberries, Gooseberries, Currants*, and the Fruits of such *Vegetables* as are low and near the Earth; and a moderate Store of *Mulberries, Cherries, Plums, &c.* and some others, that grow at something of a greater Height: Yet our *Apples, Pears, Walnuts*, and the Production of the taller Trees, have been fewer, and those not so thoroughly ripened and brought to Perfection as they are in more benign and warm Seasons.

And, indeed, in Trees of the same Kind, those that keep closest to the Earth, always produce most and best Fruit: For which Reason it is, that Gardeners check and restrain the Growth of their better Fruit-trees, and prevent their running up to too great an Height.

As to our *Grapes, Apricocks, Peaches, Nectarines*, and *Figs*, they being transplanted hither out of warmer Countries, it is less to be wonder'd at, that we fail of them in cold Summers.

Nor is it that Heat only which promotes *Vegetation*, but any other indifferently according to its Power and Degree; as we find from our Stoves, Hot-beds, &c.

VERATRUM, [so called as though *vere atrum*, i. e. truly black, because this Plant has a black

a black Root, or because it purges a black Humour.] White Hellebore.

The Characters are ;

The Flower is naked, consisting of six Leaves, which expand in Form of a Rose, in the Middle of which arises the Pointal, surrounded by six Stamina, or Threads, which afterwards turns to a Fruit, in which, for the most part, three membranaceous Sheaths are gathered into a little Head, and are full of oblong Seeds, resembling a Grain of Wheat, and encompass'd, as it were, by a leafy Wing.

The Species are ;

1. VERATRUM ; *flore subviridi.* Tourn. White Hellebore with a greenish Flower.

2. VERATRUM ; *flore atro-rubente.* Tourn. White Hellebore with a dark red Flower.

The first of these Plants is that which is ordered for medicinal Use, and is, by much, the stronger and more acrid Plant ; for when both Sorts are placed near each other, the Snails will entirely devour the Leaves of the second Sort, when at the same time they will scarcely touch those of the first. The second Sort doth also appear sooner in the Spring, and flowers near a Month before the first Sort.

These Plants are very pretty Ornaments when planted in the middle of open Borders of the Pleasure-Garden ; for if they are placed near Hedges or Walls, where generally Snails do harbour, they will greatly deface the Leaves, especially of the second Sort, by eating them full of Holes ; and as a great Part of the Beauty of these Plants consists in their broad-folded Leaves, so when they are thus defaced, the Pleasure is almost lost.

They may be propagated by parting their Roots toward the latter end of February or the beginning of March, just before they begin to shoot, and should be planted in a light, fresh, rich Soil, in which they will thrive exceedingly, and produce strong Spikes of Flowers. These Roots should not be removed oftener than once in three Years, by which time (if they like the Soil) they will be very strong, and afford many Heads to be taken off ; but if they are frequently transplanted, it will prevent their increasing, and cause them to flower very weak.

You may also propagate these Plants by Seeds, which should be sown as soon as ripe, either in a Bed or Box filled with fresh, light Earth, and the Ground kept constantly clear from Weeds. In the Spring the Plants will appear, at which Time, if the Season be dry, you should now and then refresh them with Water, which will greatly promote their Growth ; and you must carefully clear them from Weeds, which, if permitted to grow, will soon over-spread and destroy these Plants while young. The Spring following, just before the Plants begin to shoot, you should prepare a Bed of fresh, light Earth, and carefully take up the young Plants, (observing not to break their Roots) and plant them therein about six Inches square, where they may remain until they are strong enough to flower, when they should be transplanted into

the Borders of the Pleasure-Garden. But as these Plants seldom flower in less than four Years, from Seeds, so this Method of propagating them is not very much practised in England.

VERBASCUM, [so call'd, as though *Verbascum*, because the Leaves of this Plant are bearded, rough, and hairy. It is also call'd *Candela Regia*, *Lychnites*, because its Leaves are used instead of Cotton in a Lamp ; it is also call'd *Phlomos*, of *φλέγω* to burn, because, it seems, as it were, to burn.] Mullein.

The Characters are ;

The Flower consists of one Leaf, which expands in a circular Form, and is cut into several Segments ; out of the Center arises the Pointal, which afterwards becomes an oval, pointed Fruit, divided into two Cells, by a middle Partition, which are filled with small angular Seeds.

The Species are ;

1. VERBASCUM ; *mas, latifolium, luteum.* C. B. P. Great white Mullein, High-taper, or Cows-Longwort.

2. VERBASCUM ; *pulverulentum, flore luteo parvo.* J. B. Hoary Mullein with small yellow Flowers.

3. VERBASCUM ; *flore albo parvo.* J. B. White flower'd Mullein.

4. VERBASCUM ; *nigrum, flore parvo, apicibus purpureis.* J. B. Sage-leav'd black Mullein.

5. VERBASCUM ; *blatteria foliis nigrum, amplioribus foliis alutis, apicibus purpurascens.* Hor. Bat. Mullein with a dark Moth-Mullein Leaf, and yellow Flowers with purplish Apices.

6. VERBASCUM ; *Orientale, Sophiæ folio.* T. Cor. Eastern Mullein with a Flix-weed Leaf.

7. VERBASCUM ; *nigrum, folio papaveris corniculati.* C. B. P. Black Mullein with a Horn-poppy Leaf.

8. VERBASCUM ; *humile, Alpinum, villosum, boraginis folio & flore.* Tourn. Low hairy Alpine Mullein, with a Leaf and Flower like that of Borage, commonly called Bears-ear Sanicle.

The four first Sorts grow wild in divers Parts of England, and are rarely cultivated, except in Botanick Gardens for Variety. The first Sort is that which is used in Medicine, which is the most common of them all, growing upon the Sides of dry Banks, in most Parts of England.

These may be all cultivated by sowing their Seeds in August, on a Bed of light Earth, in an open Situation, where the Plants will come up the succeeding Month, and will endure the Winter's Cold very well, provided they have a dry Soil. In February the Plants should be transplanted where they are to remain, allowing them a great Distance ; for they grow pretty tall and large : In June following they will flower, and their Seeds will be ripe in July. But notwithstanding these Plants grow wild in England, yet two or three of each Kind may be admitted in large Gardens, for the Variety of their hoary Leaves, together

ther with the extreme Sweetrieffs of their Flowers, which have a Scent somewhat like Violets.

The fifth, sixth, and seventh Sorts are not Natives of this Country, but have been obtain'd from abroad; the fifth was sent from *Leyden*, by the learned Dr. *Boerhaave*, but I don't at present know from whence he receiv'd it. The sixth Sort was gather'd by my ingenious Friend Mr. *Henry Hopkey*, upon *Gibraltar Hills*, from whence he sent me the Seeds, which flourish'd in the *Physick Garden* very well two Years, and flower'd extremely, but did not perfect Seeds, and being a biennial Plant is since intirely decay'd.

The seventh Sort was found in the *Levant* by Monsieur *Tournesort*, chief Botanist to the late *French King*, who brought the Seeds to the Royal Gardens at *Paris*, from whence it hath been communicated to several other curious Gardens in *England* and *Holland*. This Plant is also biennial, and rarely produces good Seeds in *England*, unless the *Summer* be warm and dry.

These Sorts may be propagated in the same Manner as the four first, but should be planted in a warm, dry Situation in *Winter*, otherwise they are very subject to be destroy'd by Frost, being Natives of warmer Countries.

The eighth Sort is a Native of the *Alps* and *Pyrenean Mountains*, and was formerly preserv'd in several Gardens with great Care, being placed in the Green-house in *Winter*, as supposing it too tender to endure the Cold of our Climate in the open Air; but this is now treated in a different Manner; for it should be placed, as much as possible, in the Shade, and managed as *Auricula's*, with which Treatment it thrives much better than if preserved with great Tenderness, and will produce Flowers and Seeds in great Plenty. This Plant may be propagated by Off-sets, as is practis'd for *Auricula's*, and should be planted in a light rich Earth, in which it will multiply very fast.

VERBENA, [takes its Name of *verrere*, *Lat.* to brush; because in old Times it was used in cleansing the Altars: It was also call'd *Peristerium*, of *Isesteg*, a Dove, because Doves are greatly delighted with it. There is no Herb of which the Ancients have said so much of its being a Vulnerary, or Wound-herb; whence it is called *Herba Vulneraria*, or a Species of the *Sideritis*: There has been no Herb of which the Poets have been more fertile in their Fictions, no Herb more commended for Sacrifices; whence it is called *Hierobotane*, of *nep* sacred, and *Botan* an Herb. Nor any Herb of which the Magi have been fuller of their Fables: They say, that if a Person crop it with his Left-hand, being circumscrib'd in a Circle, before he has seen Sun or Moon, then he shall obtain whatsoever he wishes for; but if it be plucked with the Right-hand, nothing will favour him.] Vervain.

The Characters are;

It hath a labiated Flower, consisting of one Leaf, whose upper Lip is upright, and, commonly

divided into two, but the under Lip is cut into three Parts, so that at the first Sight it appears like a Flower with five Leaves; these Flowers are each succeeded by four naked Seeds, which fill the Calix; to which may be added, the Flowers do generally grow in Spikes or Heads, but not in Whorles round the Stalks.

The Species are;

1. **VERBENA**; *communis*, *cærulea flore*. C. B. P. Common Vervain with a blue Flower.

2. **VERBENA**; *Lusitanica*, *latifolia*, *procerior*. Tourn. Taller broad-leav'd Portugal Vervain.

3. **VERBENA**; *Urticæ folio*, *Canadensis*. H. R. Par. Canada Nettle-leav'd Vervain.

4. **VERBENA**; *Americana*, *spica multiplici*, *foliis Urticæ angustioribus*, *floribus cæruleis*. Par. Bat. Prod. American Vervain with many Spikes, narrow Nettle Leaves, and blue Flowers.

There are several other Species of this Plant, which are preserv'd in curious Botanick Gardens; but it is not my Purpose to enumerate them in this Place, as being Plants of no great Beauty or Use.

The first here-mentioned is very common in most Parts, and is rarely cultivated in Gardens; this is the Sort which is directed by the College of Physicians for medicinal Use, and is brought to the Markets by those who gather it in the Fields.

The other Sorts, though not Natives of this Country, yet are very hardy, and will endure the sharpest of our Winters in the open Air.

These may all be propagated by sowing their Seeds on a Bed of fresh Earth in the Spring, and when the Plants come up they should be transplanted out, or thinned so as to allow them ten or twelve Inches Distance, (for they generally grow pretty large, and require to have Room) after which they will require no farther Care, but to clear them from Weeds, and the second Summer they will flower and seed, which, if permitted to fall upon the Ground, will come up the succeeding Spring, without any farther Culture.

VERGE, is the Edge or Outside of a Border; but in Gardening it is generally understood to be a Slip of Grass which joyns to Gravel Walks, and divides them from the Borders in the Parterre Garden.

VERONICA, [was so call'd after the Princess *Veronica*, who first discovered it.] Speedwell or Fluelling.

The Characters are;

The Leaves, for the most part, grow opposite by Pairs; the Calix consists of one Leaf, which is divided into four Parts, and expands in form of a Star; the Flower consists of one Leaf, which is, for the most part, divided into four Segments, and expands in a circular Order; when the Flower decays, the Ovary becomes a membranaceous Fruit, divided into two Cells, which are shap'd like a Heart, and are fill'd with Seeds, which are sometimes small, and at other times large and thick.

The Species are;

1. VERONICA; *mas, supina, & vulgarissima*. C. B. P. Common Male Speedwell or Fluellin.

2. VERONICA; *spicata, angustifolia*, C. B. P. Narrow-leav'd spik'd Speedwell.

3. VERONICA; *major, latifolia, erecta*, Mor. Hist. Greater broad-leav'd upright Speedwell.

4. VERONICA; *multicaulis, Pannonica*. Tourn. Hungarian Speedwell, bearing many Stalks or Spikes of Flowers.

5. VERONICA; *spicata, Cambro-Britannica, Bugula subhirsuto folio*. Raii Syn. Edit. 3. Welsh spiked Speedwell, with a hairy Bugle Leaf.

6. VERONICA; *cerulea, trifido, aut quinquefido folio*. Flor. Bat. Blue Speedwell with a trifid or quinquefid Leaf.

7. VERONICA; *Virginiana, altissima spica multiplici, floribus candidis*. Flor. Bat. Tall Virginian Speedwell, with many Spikes and white Flowers.

8. VERONICA; *spicata, longifolia*. Tourn. Long-leav'd spik'd Speedwell.

9. VERONICA *petraea, sempervirens*. Pon. Bald Ever-green Rock Speedwell.

There are many other Species of this Plant, which are cultivated in Botanick Gardens for Variety, some of which are Natives of England, but as they are seldom preserved in Gardens for Pleasure, so I thought it not worth while to enumerate them in this Place; those here-mentioned being the most beautiful, and best worth cultivating for their Flowers.

The first Sort grows wild, in Woods and other shady Places, in divers Parts of England, and is a Plant of little Beauty, but as it is the Sort which is used in Medicine, under the Title of *Paul's Betony*, so I thought it not amiss to set it down here. This is generally brought to Market by such Persons who make it their Business to gather Herbs in the Fields to supply the same, so that it is not often cultivated in Gardens; but those who have a Mind to propagate it, may do it with much Ease; for as the Branches trail upon the Ground, they push out Roots from their Joints, which Branches being cut off and planted, will take Root and grow in almost any Soil or Situation.

The second, third, and fourth Sorts are very ornamental Plants in the large Borders of the Flower-Garden, particularly the fourth, which produces a great Number of Spikes of beautiful blue Flowers. These continue flowering at least two Months, and in cool, moist Seasons much longer; and these Flowers are very proper to cut for Basons or Flowers-pots to adorn Rooms in the Summer-season.

The fifth Sort is a Native of the Mountains in Wales, from hence it hath been transplanted into many curious Gardens. This produces fine large Spikes of blue Flowers, and deserves a Place in every Garden.

The sixth, seventh, eighth, and ninth Sorts are Natives of warmer Countries than England, but are hardy enough to endure the

Cold of our Winters very well, provided they are planted in a dry Soil. These are all pretty Varieties, and do succeed each other in Flowering, which renders them worthy of a Place in every curious Garden. These should all be planted in the Middle of the Borders in the Pleasure-Garden, (except the fifth and ninth, which seldom grow above a Foot high, and so are better placed amongst Flowers of the same Growth) where, being intermix'd with other Flowers, they afford an agreeable Variety.

They may be propagated by parting of their Roots, which commonly increase very fast, so that the raising 'em from Seeds is seldom practis'd. The best Time for parting and transplanting the Roots is in September, that they may have Time to take fresh Root before the Winter comes on; and these being fix'd in Autumn, will be much stronger than those which are remov'd in the Spring, and will produce a greater Number of Flowers.

They may be planted in almost any Situation, but should have a middling fresh Soil, not too wet, in which they will thrive exceedingly, and require no farther Care but to keep them clear from Weeds, and to part their Roots every Autumn; for if they are suffer'd to remain too long unremov'd, their Roots will spread, and take up too much Room in the Borders, so as to injure such Plants as grow near them.

VIBURNUM; The Way-faring or Pliant Mealy Tree.

The Characters are;

The Flower consists of one Leaf, which is divided into five Parts, and expands in a circular Order; these are collected into the Form of an Umbrello; the Ovary, which is placed on the upper Part of the Flower, becomes a soft Berry, full of Juice, which contains one stony, compress'd, furrow'd Seed.

The Species are;

1. VIBURNUM; *Matth.* The common Viburnum, or Pliant Mealy Tree.

2. VIBURNUM; *folio variegato*. The common Viburnum with strip'd Leaves.

3. VIBURNUM; *Americanum, odoratum, urticae foliis latioribus, spinosum, floribus miniatiss.* Par. Bat. Prod. American sweet-scented Viburnum with Broad Nettle Leaves, beset with Thorns and Vermilion Flowers.

4. VIBURNUM; *Americanum, odoratum foliis urticae, floribus miniatiss.* H. L. American sweet-scented Viburnum with Nettle Leaves and Vermilion Flowers.

5. VIBURNUM; *Cisti seminae seu Salviae foliis mucronatis, Americanum, odoratum, minus, floribus incarnatis.* Par. Bat. Prod. Lesser American Viburnum, with Leaves like the Female Cistus, and pale-colour'd Flowers.

6. VIBURNUM; *Americanum, Salviae foliis obtusis, floribus albis* Par. Bat. Prod. American Viburnum, with Blunt Sage Leaves and white Flowers.

7. VIBURNUM; *Americanum, Cisti seminae seu Salviae foliis mucronatis, floribus luteis.* Par. Bat. Prod. American Viburnum, with Leaves

Leaves like those of the Female Cistus, and yellow Flowers.

8. *VIBURNUM*; *Americanum*, *folio urticae*, *floribus ex aureo & roseo mistis*. Boerb. Ind. American *Viburnum* with a Nettle Leaf, and gold and rose-colour'd Flowers intermix'd.

The first of these Trees is very common in divers Parts of *England*, particularly in *Kent*, where it grows in most of the Hedges upon the dry, chalky Hills near *Gravesend*, *Rocheſter*, &c. in very great Plenty. But notwithstanding it being thus common, yet it deserves a Place in small Wilderness Quarters, among other flowering Trees, where, by its mealy Leaves and Shoots, together with its large Bunches of white Flowers in the *Spring*, which are succeeded by red Berries, in *Autumn*, it affords an agreeable Variety.

This Tree may be propagated either from Seeds, or by laying down the tender Branches; but the former Method being tedious, is seldom practis'd, especially since young Plants may be taken from the Woods or Hedges, where there are many of the old Trees growing; from which a Number may soon be propagated.

The best Time for laying these Branches is in *Autumn*, just as the Leaves begin to fall, (the Manner of laying them being the same as for other hardy Trees, need not be here repeated); by the succeeding *Autumn* the Layers will be rooted, when you may take 'em off from the old Plants, and transplant them into a Nursery for two or three Years, in which they may be train'd up to regular Stems and Heads, and may afterwards be planted where they are to remain. This Tree commonly grows about twelve or fourteen Feet high, but it is rarely seen above sixteen or eighteen, so that it should be planted in Lines with such Trees as do not exceed this Growth; otherwise it will be hid thereby, and their Beauty lost.

The strip'd Sort may be propagated by inarching it upon the plain Sort. This is preserved by such as delight in variegated Plants, but there is no great Beauty in it; but these Trees do seldom grow near so large as those of the plain Sort, as is the Case of all other strip'd Plants.

There is also another Sort very like to the Common, which has been introduced into the *English* Gardens lately, which was brought from *Virginia*; but as this Sort has not yet flower'd with us, so I can't say how it differs from ours. This was at first somewhat tender, while young, and in the sharp *Winter Anno 1728*. the Plants of this Kind, which were plac'd in the open Air, were kill'd down to the Ground; but the Roots of most of them shot up again the succeeding *Spring*, and have since endured the Cold of our *Winters* very well.

All the other *American* Sorts are Natives of the warm Parts of the *West-Indies*, where, by the *English* Inhabitants, they are promiscuously called *Wild Sage*; but by the Natives of those Countries, they are called *Camara*,

which; by *Pere Plumier*, is the Name appropriated to the Genus.

These are all tender Plants, requiring the Assistance of a Stove, to maintain them in this Country. They may be propagated by planting their Cuttings, during any of the *Summer* Months, into Pots fill'd with fresh, light, rich Earth, and plunged into a moderate Hot-bed, observing to water and shade them until they have taken Root, after which they may be removed into the Stove, hardening them by degrees, to bear the open Air, into which they should be removed in *July*, placing them where they may be defended from strong Winds, in which Situation they may remain until the Middle or latter End of *September*, when they must be carried into the Stove, and placed where they may have a moderate Warmth, but as much free Air as possible in very mild Weather.

During the *Winter* Season these Plants must be frequently refresh'd with Water, which should be placed in the Stove at least twenty four Hours before it be used, that it may have acquired a proportionable Warmth to the Air of the House, and must be given to them in small Quantities; for much Wet at that Season is very injurious to these Plants. The temperate Heat (as mark'd on Mr. *Fowler's* Botanical Thermometers) is what these Plants succeed best with; for if the Stove be kept too warm, the Plants are very subject to shoot in *Winter*, and the Branches which are produced at that Season are always weak, and seldom flower well, so that the Strength of the Plant is greatly exhausted in nourishing weak and irregular Shoots: But if the House in which they are placed be not kept to near that Heat, the tender Shoots will decay, and many times the Head of the Plants will be entirely destroy'd by Cold.

In *June*, when the Weather is settled, these Plants may be brought out of the House, but they should not be expos'd to the open Air and Sun, at first, but rather placed near Hedges or other Trees, whereby they may be sheltered, and by Degrees inured to the open Air; which, if they are suddenly expos'd to, will cause their Leaves to change brown, and appear unsightly; and the Growth of the Plants will also be greatly retarded thereby. During the Time they are abroad they must be frequently water'd; for the Sun and Air will dry the Earth in the Pots, much faster than while they remain'd in the House; so that if they are not supply'd with Moisture, they will not produce their Flowers so soon, nor near so strong, in which the Beauty of these Plants doth consist.

The Beginning of *August* the Flowers will begin to appear at the Extremity of the Branches, and if the Plants are carefully manag'd, they will continue flowering until *December*; and during this Time they will afford as much Pleasure as most other exotic Plants, their Flowers growing in close Bunches, and are, for the most part, of a very beautiful Colour; but these Plants rarely produce good Seeds in this Country.

The

The Soil in which these Plants thrive best is the following Mixture viz. one Load of fresh light Earth, one Load of very rotten Dung, or Tanners-Bark, and a Load of Sea-Sand; these should be well mix'd and laid in a Heap, three or four Months before it be used, observing to turn it over often, to sweeten and mix the Parts, as also to prevent Weeds from growing thereon; and before it be put into the Pots, it should be screen'd roughly, just to separate the large Stones and Clods from it; but by no Means sift it very fine; for when it is rendred very fine, the often watering of the Plants will cause it to join and consolidate into one entire Mass, whereby the Moisture will be detain'd, which will rot the tender Fibres of the Roots, so that the Plants will grow sickly, and if not remedied, shortly decay.

VICIA; [so call'd of *Vincire*, Lat. to bind, because it clings about any Stays or Supporters.] Vetch.

The Characters are;

It hath a papilionaceous Flower, out of whose Empalement arises the Pointal, which afterwards becomes a Pod full of roundish or angular Seeds; to which must be added, The Leaves grow as it were by Pairs, on a Middle-rib ending in a Tendril.

The Species are;

1. VICIA; *sativa, vulgaris, semine nigro.* C. B. P. Common Vetch or Tare.
2. VICIA; *sativa alba.* C. B. P. White Vetch or Tare.
3. VICIA; *supina, latissimo folio non serrato.* Tourn. Low Vetch, with a broad Leaf not serrated.
4. VICIA; *supina, latissimo folio serrato.* Tourn. Low Vetch, with a broad serrated Leaf.
5. VICIA; *siliquis supra infraque terram edens.* Tourn. Eatable Vetch, having Pods both above and below Ground.
6. VICIA; *multiflora.* C. B. P. Many-flower'd Vetch.

There are a great Variety of these Plants, many of which are preserv'd in curious Botanick Gardens; but as they have little Beauty in their Flowers, nor are of much Use, so it would be to little Purpose to enumerate 'em in this Place.

The first of those here mention'd, are cultivated in the Fields in divers Parts of England for the Seed, which is the common Food of Pigeons: The Method of cultivating them being much the same as is practis'd for Peas, I shall not repeat it in this Place, but refer the Reader to that Article.

The second Sort is a Variety of the first, from which it only differs in the Colour of the Flowers and Seeds, which in this kind are both white; but the Flowers of the other kind are purple, and the Seeds are black. This may be cultivated as the former.

The third and fourth Sorts are, at present, only preserv'd in Botanick Gardens in England, tho' I believe they might be cultivated in the Fields, as the common Sort, with good Success.

These must be sown in the Spring, as Peas, but should have a light, dry Soil, and do require more Room than the common Sort, for

the Plants are apt to spread pretty far, provided they like their Situation. They are both annual Plants, which decay soon after their Seeds are ripe. These are suppos'd to be the *Bean* of the ancient Greeks.

The fifth Sort was carry'd from Africa into the West-Indies (by the Negroes, who are very fond of its Fruit) where it thrives prodigiously; and when once well fix'd in the Ground, will propagate itself very fast: for soon after the Flowers fade, the Pedicle thrusts itself under the Surface of the Earth, where the Fruit is perfected; which if not sought for, and taken up when ripe, will soon shoot out, and make fresh Plants: So that the Persons who have not been acquainted with this Plant, seldom know how and when to look for their Pods, by which Means the Negroes generally gather them for their own Use. This Plant is also an Inhabitant of the East-Indies, and also in divers Parts of Asia hath been long cultivated; though there seem to be no extraordinary Quality in it to recommend it. In England it is only preserv'd as a Curiosity, and must have the Assistance of a Hot-bed, otherwise the Fruit will not ripen.

The sixth Sort grows wild in divers Parts of England, under Hedges, and by the Sides of Woods, where it climbs upon whatever Bushes are near it; and during the Time of flowering (which is commonly in June and July) it affords an agreeable Prospect. This Plant may be cultivated by the Sides of Wilderness Quarters, where it may be allow'd to climb upon some low Bushes, without which Support it seldom thrives well; and in such shady Situations it will flower extremely, and continue for several Years. The best Way to propagate it, is by sowing the Seeds either in Spring or Autumn, in the Places where they are to remain; for these Plants commonly shoot their Roots downright into the Ground, so that they seldom thrive well if transplanted.

VINCETOXICUM; vide *Asclepias*.

VINE; vide *Vitis*.

VIOLA; Violet.

The Characters are;

It hath a polypetalous, anomalous Flower, somewhat resembling the papilionaceous Flower; for its two upper Petals, in some measure, represent the Standard, the two side ones the Wings, but the lower one, which ends in a Tail, in some measure resembles the Keel; out of the Palement arises the Pointal, which afterwards becomes a Fruit, for the most part three corner'd, opening into three Parts, and full of roundish Seeds.

The Species are;

1. VIOLA; *martia, purpurea, flore simplici odore.* C. B. P. Common purple Violet, with a sweet-scented Flower.
2. VIOLA; *Martia, major, hirsuta, inodora.* Mor. Hist. Greater hairy March Violet without Smell.
3. VIOLA; *Martia, inodora, sylvestris.* C. B. P. Wild or Dogs Violet.
4. VIOLA;

4. *VIOLA*; *Martia, alba*. C. B. P. White sweet-scented *Violet*.

5. *VIOLA*; *Martia, multiplici flore*. C. B. P. Double purple *Violet*.

6. *VIOLA*; *Martia, flore multiplici candido*. C. B. P. Double white *Violet*.

7. *VIOLA*; *Martia, folio eleganter variegato, flore albo*. March *Violet*, with a beautiful variegated Leaf, and a white Flower.

8. *VIOLA*; *Martia, flore rubello*. March *Violet*, with a reddish colour'd Flower.

9. *VIOLA*; *erecta, flore caeruleo*. Mor. Hist. Upright *Violet*, with a blue Flower.

10. *VIOLA*; *Montana, lutea, grandiflora*. C. B. P. Mountain *Violet*, with a large yellow Flower.

11. *VIOLA*; *tricolor, bortenensis, repens*. C. B. P. Pansies, Hearts-ease, or Three-colour'd *Violet*, commonly call'd Three Faces under a Hood.

The first Sort here mention'd is very common in Woods and shady Lanes in divers Parts of England, and is what should always be us'd in Medicine; though sometimes the People who sell these Flowers in the Markets, do many times impose upon the Ignorant the Flowers of the second Sort, which are much larger than those of the first, and fill up the Measure better; but they having no Smell, are very improper for Use.

All the eight first Sorts are pretty Varieties in a Garden; where being planted under Hedges, in Wildernesses, or other shady Places, they will thrive exceedingly, and will want no other Culture than only to keep them clear from Weeds; and in the Spring, when they are in Flower, they cast forth a most agreeable Perfume, especially in Mornings or Evenings, so that it renders such Places very delightful at that Season.

These may be easily propagated by parting their Roots. The best Time for which, is at Michaelmas, that the Plants may take Root before Winter, so that they may flower stronger the succeeding Spring.

The double Sorts, and those without Smell, may be admitted for Variety: But the single blue, white and reddish colour'd Sorts, are those which should be most cultivated; because these are all equally well scented, in which the greatest Curiosity of these Flowers consists. And these all growing wild in England, may be easily obtain'd in Quantity from their Places of Growth, by such who are fond of these Flowers.

The ninth Sort is preserv'd in some curious Gardens for Variety, but there is no Scent in its Flowers, so that it hardly merits a Place in curious Flower Gardens.

The tenth Sort produces large yellow Flowers, which continue a long time: This being a Native of cold mountainous Places, should have a shady cool Situation, and is very proper for North Borders, where it will thrive exceedingly, and continue flowering most Part of the Summer. It is propagated by parting of the Roots, in the same manner as the former.

The eleventh Sort is admitted into Gardens for the beautiful Colours of its Flowers, of

which there are a great Number of Varieties, but they have no Scent. This Plant is annual, but will require no other Culture than only to place a few Rods in such Parts of the Garden where you would have them grow, and suffer them to shed their Seeds, which will come up and multiply fast enough; therefore you must observe to reduce them within Compass, otherwise they will spread over the whole Garden. This Plant is plac'd amongst the Official Simples in the College Dispensatory.

VIORNA; vide *Clematitis*.

VIRGA AUREA; [This Plant is so call'd because the Stalk resembles a Rod, and its Flower is of a golden Colour.] Golden-Rod.

The Characters are;

The Leaves are for the most part whole, and are plac'd alternately on the Stalks; the Calix (or Flower-cup) is squamous; the Flowers are small, radiated, and of a yellow Colour, consisting of many Florets, each of which is furnish'd with an Embryo, which afterwards becomes a Seed, having a downy Substance adhering to it. To which should be added, that the Flowers are produc'd in a long Spike.

The Species are;

1. *VIRGA AUREA*; *vulgaris, latifolia*. J. B. The common or broad-leav'd Golden-Rod.

2. *VIRGA AUREA*; *montana, folio angusto subincano flosculis conglobatis*. Raii Syn. Narrow-leav'd Mountain Golden-Rod, with an hoary Leaf and conglobate Flowers.

3. *VIRGA AUREA*; *angustifolia, paniculâ speciosâ Canadensis*. H. R. Par. Narrow-leav'd Canada Golden-Rod, with a specious Panicle.

4. *VIRGA AUREA*; *Canadensis, hirsuta paniculâ minus speciosa*. Boerb. Ind. Rough Canada Golden-Rod, with a less specious Panicle.

5. *VIRGA AUREA*; *Novæ Angliæ, altissima, paniculis nonnunquam reflexis*. Flor. Bat. The tallest New-England Golden-Rod, with a reflex'd Panicle.

6. *VIRGA AUREA*; *altissima, serotina, paniculâ speciosâ patulâ*. Rand. Tallest Late-flowering Golden-Rod, with a specious spreading Panicle.

7. *VIRGA AUREA*; *Virginiana, foliis angustioribus, asperis, paniculâ minus speciosâ*. Pluk. Phyt. Virginian Golden-Rod, with narrow rough Leaves, and a less specious Panicle.

8. *VIRGA AUREA*; *rugosis foliis, Virginiana, paniculâ florum amplissimâ*. Pluk. Phyt. Rough-leav'd Virginian Golden-Rod, with an ample Panicle of Flowers.

9. *VIRGA AUREA*; *foliis levibus non serratis, paniculâ speciosâ floribus magnis*. Flor. Bat. Smooth-leav'd Golden-Rod, with a specious Panicle, and large Flowers.

10. *VIRGA AUREA*; *Marylandica, spicis florum racemosis, foliis integris scabris*. Mart. Hist. Rar. Plaut. Golden-Rod from Maryland, with branching Spikes of Flowers, and whole rough Leaves.

11. VIRGA AUREA ; *Canadensis Asterisfolio*. Par. Bat. Canada Golden-Rod, with a Leaf like Asteriscus.

12. VIRGA AUREA ; *Americana, serrata, floribus ad foliorum alas, conglobatis*. Breyn. Prod. American Golden-Rod, with serrated Leaves and conglobated Flowers coming out from the Wings of the Leaves.

13. VIRGA AUREA ; *Limonii folio, paniculâ uno versu dispositâ*. H. R. Par. Golden-Rod, with a Sea Lavender-leaf, and the Flowers growing upon one Side of the Stalk.

14. VIRGA AUREA ; *Noveboracensis, glabra, caulibus rubentibus, foliis angustis glabris*. Flor. Bat. Smooth New-York Golden-Rod, with red Stalks, and narrow, smooth Leaves.

15. VIRGA AUREA ; *floribus fistulosis, senecionis instar, foliis angustioribus non serratis*. Hist. Oxon. Golden-Rod, with fistulous Flowers, somewhat like Groundsel, and narrow, smooth Leaves.

16. VIRGA AUREA ; *Canadensis, foliis carnosiss non serratis, latioribus*. Hist. Oxon. Canada Golden-Rod, with broad fleshy smooth Leaves.

17. VIRGA AUREA ; *Novæ-Angliæ, foliis longissimis glabris*. Flor. Bat. Eew-England Golden-Rod, with long, smooth Leaves.

There are several other Varieties of this Plant, which are preserv'd in some curious Botanick Gardens ; but those here mention'd are the most valuable Sorts which I have yet seen in the English Gardens ; the greatest Part of which are Natives of America, from whence, it is very probable, there may be many other Sorts brought, since these Plants do propagate themselves by shedding their Seeds, which is likely to produce new Varieties annually ; as do most other Sorts of Plants, so that there may be no End to their Variety.

These Plants are very great Ornaments in the Borders of large Flower-Gardens, where, by their Succession of Flowering, they afford a very great Pleasure ; for the earliest Kinds begin to flower in June, which are succeeded by other Sorts until the latter End of October ; and their Flowers being produc'd for the most Part on long specious Spikes or Panicles, do make a very handsome Appearance, and are very ornamental to Flower-pots, when intermix'd with Flowers of different Colours, to place in Rooms.

They are all easily propagated by parting their Roots in the Spring, before they begin to shoot, and should be planted in the Middle of the larger Borders in the Flower-Garden : They will grow in almost any Soil or Situation, but will thrive best in a light fresh Earth, and an open Exposure, tho' some of the hardest of them may be plac'd under Avenues of Trees, where they will continue in Flower a long time, and look very well. The first twelve Sorts are somewhat hardier than the rest, and will increase very fast by Off-sets, which some of them send forth in very great Plenty, insomuch, that if they are not carefully dug round at least once in every Year, they will spread over the Borders where they are planted, and destroy such Plants as stand near them. The other Sorts should have a warmer

Situation, and a dry Soil : These are not so apt to spread at their Roots as the others, so that there will be no Difficulty of keeping them within Bounds.

The first Sort here mention'd is sometimes us'd in Medicine. This grows wild in most shady Woods in the South Parts of England ; from whence the Roots may be transplanted into a shady Part of the Garden, where they will thrive and flower very well.

These are all perennial Plants, which die to the Surface of the Ground every Winter, but rise again the succeeding Spring : Most of them produce their Flowers in Autumn, and, if the Season proves favourable, will ripen their Seeds ; which if sown soon after ripe, will come up the following Spring, from whence some new Varieties may be obtain'd.

VISCUM ; [so call'd, because its Fruit is full of a glutinous Substance.] Mistleto.

The Characters are ;

The Flower consists of one Leaf, which is shap'd like a Basen, and for the most part divided into four Parts, and beset with Warts ; the Ovary, which is produc'd in the Female Flowers, is plac'd in a remote Part of the Plant from the Male Flowers, and consists of four shorter Leaves ; this afterwards becomes a round Berry, full of a glutinous Substance, inclosing a plain Heart-shap'd Seed.

We have but one Species of this Plant in England, viz.

Viscum ; *baccis albis*. C. B. P. Common Mistleto, with white Berries.

This Plant is always produc'd from Seed, and is not to be cultivated in the Earth, as most other Plants, but will always grow upon Trees ; from whence the Antients accounted it a Super-plant, most of whom thought it was an Excrecence on the Tree without the Seed being previously lodg'd there : Which Opinion is now generally confuted from a repeated Number of Experiments.

The manner of its being propagated is this ; (viz.) The Mistle-Thrush, which feeds upon the Berries of this Plant, in Winter, when it is ripe, doth often carry the Seeds from Tree to Tree ; for the viscous Part of the Berry, which immediately surrounds the Seed, doth sometimes fasten it to the outward Part of the Bird's Beak : which to get disengag'd of, he strikes his Beak against the Branches of a neighbouring Tree, and thereby leaves the Seed sticking by this viscous Matter to the Bark ; which if it lights upon a smooth Part of the Tree, will fasten it self thereto, and the following Winter will put out and grow, and in the same manner it may be propagated by Art ; for if the Berries, when full ripe, are rubbed upon the smooth Part of the Bark of a Tree, they will adhere closely thereto, and if not destroy'd, will produce Plants the following Winter.

The Trees which this Plant doth most readily take upon, are, the Apple, the Ash, and some other smooth-rind Trees ; but I have several times try'd it upon the Oak, without Success, for the Bark of that Tree is of too close a Texture to admit the Seeds striking therein ;

therein ; which is also the Reason it is so rarely found upon that Tree : And notwithstanding the great Encomiums which have been given to the *Mistletoe* of the *Oak*, for its Medicinal Virtues, yet I can't help thinking, that it is equally good from whatever Tree it be taken, nor is it possible to find this Plant growing in any Quantity upon the *Oak* ; so that those Persons who pretend to furnish the Town with it for Physical Use, do but impose upon the World, for it is so rarely met with, that whenever a Branch of an *Oak-tree* hath any of these Plants growing upon it, it is cut off, and preserv'd by the Curious in their Collections of Natural Curiosities ; and of these there are but few to be seen in *England*.

As to what some Persons have asserted of the manner how it is propagated, from Tree to Tree, by the *Mistletoe-Thrushes*, who eat the Berries, and void the Seed in their Dung, upon the Branches of Trees, whereby the Seeds are stuck thereon, and take Root into the Bark, and produce fresh Plants, I can by no means agree to ; since if it were only this way propagated, it would always be found upon the upper Part or the Sides of such Branches, upon which the Dung can only be suppos'd to lodge ; whereas it is often found upon the under Side of Branches, where it is almost impossible for these Birds to cast their Dung : Besides, I believe the Stomachs of these Birds are too powerful Digesters to suffer any Seeds to pass intire through the Intestines. But I shall leave this to such who have Leisure to make Observations in such Places where this Plant abounds, and shall add only a short Account of the Method us'd to make Birdlime, which may not be improper to insert in this Place for the Satisfaction of the Curious.

The *Italians* make their Birdlime of the Berries of *Mistletoe*, heated and mix'd with Oil, as that made of *Holly-bark*, and to make it bear the Water, they add *Turpentine*.

That which is commonly used with us, is made of the Bark of *Holly* ; which they boil for ten or twelve Hours : and when the green Coat is separated from the other, they cover it up for a Fortnight in a moist Place, pounded into a tough Pate, that no Fibres of the Wood be left ; then they wash it in a running Stream till no Motes appear, and put it up to ferment for four or five Days, and skum it as often as any thing arises, and then lay it up for Use. When they use it, they incorporate with it a third Part of that Oil over the Fire.

The Birdlime that is brought from *Damascus* is suppos'd to be made of *Sebestens*, their Kernels being frequently found in it ; but this will not endure either Frost or Wet.

The Birdlime brought from *Spain* is of an ill Smell.

The Bark of our *Lantane* or *Way-faring Shrub*, as it is said, will make Birdlime as good as the best.

VITEX ; [so call'd of *vico*, Lat. *to bend*, because its Branches are very flexible : It is also call'd *Agnus Castus*, because it is believ'd

to allay Lust, for which the *Monks* were wont to use it in their Cloysters ; but by the Taste and Smell, it should rather be a Provocative : It is also call'd *Salix Americana*, because its Leaves resemble those of a *Willow*.] *Agnus Castus*, or the Chaste Tree.

The Characters are ;

It hath a Flower consisting of one Leaf, which appears as if it had two Lips, the Fore-part is tubulose ; from whose Flower-cup rises the Pointal, which afterwards becomes an almost-spherical Fruit, which is divided into four Cells, in which are contained oblong Seeds ; to which may be added, The leaves are digitated (or finger'd) like those of *Hemp*.

The Species are ;

1. **VITEX** ; *foliis angustioribus, cannabis modo dispositis*. C. B. P. The Chaste Tree, with narrow Leaves.

2. **VITEX** ; *latiore folio*. C. B. P. The Chaste Tree, with broad serrated Leaves.

3. **VITEX** ; *five Agnus, flore albido*. H. R. Par. The Chaste Tree, with whitish Flowers.

4. **VITEX** ; *five Agnus minor, foliis angustissimis*. H. R. Par. The lesser Chaste Tree, with very narrow Leaves.

The first of these Plants is pretty common in most *English* Gardens, where a Variety of hardy Trees are preserv'd ; but the other Sorts are less common, and only in some curious Gardens at present. These Plants are all very hardy, and may be propagated by planting their Cuttings early in the *Spring*, before they shoot ; they require a fresh light Soil, and must be frequently refresh'd with Water, until they have taken Root ; after which they must be carefully clear'd from Weeds, during the *Summer* Season ; and if the *Winter* proves severe, you must lay a little Mulch upon the Surface of the Ground between the Plants, to prevent the Frost from penetrating to their Roots, which would injure them while they are young : Toward the Middle of *March*, if the Season be favourable, you should transplant them either into the Places where they are design'd to remain, or into a Nursery for two or three Years, to get Strength ; where they must be prun'd up, in order to form them into regular Plants, otherwise they are very subject to shoot out their Branches in a straggling manner.

If these Plants are plac'd in a warm Situation, and have a kindly light Soil, they will grow to be eight or ten Feet high, and produce their Spikes of Flowers at the Extremity of every strong Shoot in *Autumn* ; which although of no great Beauty, yet coming late in the Year, and having an odd Appearance, together with the Variety of their Leaves, renders them worthy of a Place in small Wilderness Quarters amongst other Shrubs of the same Growth.

They may also be propagated by laying down their Branches in the *Spring* of the Year, (in doing of which, you must be very careful not to break them, for their Shoots are extremely brittle, and very subject to split off with the least Violence) : These will take Root in one Year, provided they are water'd in

In very dry Weather; and may then be transplanted out, and manag'd as was directed for those Plants rais'd from Cuttings.

VITIS; [so call'd from *vico*, Lat. to bend, or bind, because its Claspers take hold of the neighbouring Plants.] The Vine.

The Characters are;

The Flower consists of many Leaves, which are placed in a circular Order, and expand in Form of a Rose; the Ovary, which is situated in the Bottom of the Flower, afterwards becomes an oval or round Fruit, which is very full of Juice, and contains many small Stones in each. To which should be added, That the Tree is climbing, sending forth Claspers at the Joints, by which it fastens it self to whatever Plant stands near it, and the Fruit is produced in Bunches.

The Species are;

1. VITIS; *sylvestris Labrusca*. C. B. P. The Wild Vine, commonly call'd the Claret Grape. This Sort of Grape is pretty well known in England; it has a Berry of a middling Size, of deep black Colour, covered over with a Bloom like a Plum, which may be wiped off; the Juice stains of a deep red Colour, and before it is quite dead-ripe, is of an austere Taste; the Bunches are pretty large, but short, having commonly two Side-Bunches or Shoulders, on the upper part of the Bunch; the Leaves of this Vine are jagged, and change a deep red Colour before they fall off.

2. VITIS; *præcox, Columella*. H. R. Par. This is called in England the July Grape, but in France, *Morillon* and *Vigne bassive*. This is the earliest Grape at present known in England, for which it is chiefly preserved, for it is not much esteem'd for its Goodness: The Skin is thick, the Juice but very indifferent, and the Berries do commonly grow very thin upon the Bunches. These are of a middle Size, and of a dark, muddy, red Colour.

3. VITIS; *Corinthiaca, sive Apyrina*. J. B. The Corinth Grape, vulgarly called the Currant Grape: Is an early Ripener, the Berry is small and slender, the Juice very sweet, and hath very little Stone. Of this Kind there are two or three different Colours, as Red, Black, and Tawney. This is the Sort which is brought from the Islands near the *Morea*, by the Name of Currants, and sold by the Grocers of London, to put into Puddings, &c.

4. VITIS; *laciniatis foliis*. Cornut. The Parsley-leav'd Grape, *vulgô*. This Sort was originally brought from Canada, where it grows wild in the Woods; and is preserv'd in the Gardens of the Curious, for the Variety of its fine jagged Leaves. This is a pretty large white Grape, and has a sweet Juice, but not very vinous; the Berries are very apt to grow thin upon the Bunches, unless the Vine is pruned short, and left but thin with Wood.

5. VITIS; *subbirsuta*. C. B. P. The Morillon Taconné, or Munier, i. e. the Miller's

Grape; this is called the *Burgundy* in England. The Leaves of this Sort are very much powder'd with White, especially in the Spring, when they first come out, from whence it had the Name of *Miller's Grape*. It produces middle-siz'd black Grapes, which grow close upon the Bunches, and are generally short and thick. This is an excellent Bearer, and a hardy Sort.

6. VITIS; *præcox Columella, acinis dulcibus, nigricantibus*. The black Morillon. This is called in Burgundy, *Pineau*, and at Orleans, *Auverna*. It is a very sweet Grape, of a middle Size, somewhat oval, and of a fine black Colour; the Bunches are somewhat longer than those of the former: This makes very good Wine.

7. VITIS; *uvâ peramplâ, acinis albidis, dulcibus durioribus*. Tourn. The Chasselas blanc, Bar-sur-Aube, White Chasselas, or Royal Muscadine. This is a large white Grape, and grows close upon the Bunches, which are also very large, and have commonly two small Side-Bunches or Shoulders, produced from the upper Part of the Bunch; the Berries, when full ripe, if well expos'd to the Sun, change to a pale amber Colour, the Juice is very rich, and the Fruit is commonly ripe early in September.

8. VITIS; *uvâ peramplâ, acinis dulcibus, nigricantibus*. Tourn. The Chasselas Noir, i. e. the Black Chasselas. This is very often called the *Black Muscadine*. The Berries of this are as large as those of the former, the Bunches are commonly larger, and are somewhat later ripe; the Juice is very rich. If well exposed, they bear well, and are ripe toward the End of September.

9. VITIS; *uvâ peramplâ, acinis dulcibus rubentibus*. Tourn. The Red Chasselas. This is also called the *Red Muscadine*. The Berries of this Sort are a little larger than those of the former, and grow much thinner upon the Bunches, are of a faint red Colour, and the Juice is very sweet, but later ripe, upon which account it is not so valuable in England.

10. VITIS; *uvâ peramplâ, acinis ovatis, albidis*. Tourn. The Burdelais, vulgarly called Burlake. The Berries of this Kind are very large, of an oval Shape, and grow pretty close on the Bunches, which are sometimes of a prodigious Size. I have seen a Bunch of these Grapes which has weigh'd five Pounds. But they never ripen in this Country, so that they are fit for nothing, except *Verjuice*, or to make *Tarts*.

11. VITIS; *acinis albis, dulcissimis*; *Vitis Apiana*. C. B. P. *Garidel*. The Muscat, or White Frontinac. The Berries of this Kind are large, and grow extremely close upon the Bunches, which are very long, and have commonly two Shoulders to them: The Fruit, when ripe, has a rich, musky Flavour; but it is commonly very late in the Autumn before they ripen, and the Berries being so very close upon the Bunches, do detain the Moisture in their Middles, so that they commonly perish:

To

To prevent which, some very curious Persons look over their Vines, soon after the Grapes are formed, and with a Pair of Scissors cut out all the small ones, so as to leave the others at a moderate Distance, whereby the Sun and Air is easily admitted, which dissipates the Moisture, and prevents their perishing. This Sort is a great Bearer.

12. *VITIS; acinis rubris, nigricantibus dulcissimus. Garidel.* The Muscat Rouge, or Red Frontinac. The Berries of this Kind are of the Size of the former, but grow much thinner on the Bunches; it is higher flavour'd, and when thorough ripe, is the richest Grape yet known. But this must have a very dry Soil, and a South-East Aspect, otherwise it seldom ripens well in England.

13. *VITIS; acinis nigricantibus, dulcissimis.* The Black Frontinac. The Berries of this Kind are less than the two former, but are not so high flavour'd; their Juice is sweet, and they are earlier ripe. This is a good Bearer, but the Grapes upon the same Bunch do seldom ripen at the same time, so that they can't be gather'd in full Bunches, but must be pick'd off singly as they ripen.

14. *VITIS; Damascena. H. R. Par.* The Damask Grape. The Berries of this Kind are very large, black, and of an oval Form; the Bunches are very large, and the Vine produces vigorous Shoots. This ripens late in England.

15. *VITIS; præcox, acino rotundo, albido dulci.* The White Sweet-water. The Berries of this Kind are large and white, the Skins are very thin, and the Juice is sweet; this is very early ripe, but the Berries are apt to be thin upon the Bunches; for it is one of the tenderest Sorts, when in Flower, that I have yet seen; so that if their happens bad Weather at that Season, they are very subject to blight, and being so uncertain in bearing, has render'd it less esteem'd than it was formerly.

16. *VITIS; præcox, acino nigro, dulci & rotundo.* The Black Sweet-water. This is a less Grape than the former, it is of a fine black Colour, and grows pretty close upon the Bunches; its Juice is sweet, and it is early ripe.

17. *VITIS; alba, dulcis. J. B.* The White Muscadine. The Berries of this Kind are large, of a white Colour, and the Juice is very sweet; the Bunches are long; and it is early ripe.

18. *VITIS; Allobrogica, Plinii. Car. Steph. Præd. Ruß.* The Raisin Grape. This is a large oval Grape of a blackish Colour, when ripe; the Bunches are very large, and make a fine Appearance, but never ripen well in England. I have known some Persons who had a great Quantity of this Sort of Grape, which they commonly cut in the Middle of October, with pretty long Stalks to the Bunches, and hung them on Strings, in Rows, in their Kitchen, at such a Distance as not to touch each other; and about Christmas, these Grapes would be so ripen'd by the Warmth of the Room, as to eat extremely well.

19. *VITIS; acino rubro, duriori, sapore dulci. Garidel.* The Greek Grape. This is a middle-siz'd Grape of a deep red Colour, the Skin is very tough, and the Stones are small; this is by many People call'd the Brick Grape. In a kindly Season, when these Grapes ripen well, they make excellent Wine; but it must have a good Wall, otherwise it will not ripen in England.

20. *VITIS; pergulana, uvâ peramplâ, acino oblongo, duro, majori & subviridi. Garidel.* The Pearl Grape, called in Provence, Pendoulau, or Rin de Ponso. This is a large, oblong Grape, of a greenish white Colour, the Juice has a Mixture of Sweet and Sour, and it is late ripe.

21. *VITIS; uvâ peramplâ, acinis, nigricantibus majoribus.* The St. Peter's Grape, or Hesperian. The Berries of this Sort are very large, round, and of a deep black Colour when ripe; the Bunches are very large, and have two Shoulders to them; the Juice is very rich, and a little ting'd with Red; the Leaves of this Sort are remarkably jagged, so as to be known when there is no Fruit upon the Vines; it is late ripe. I believe this is the same Sort which the French call Gros Noir d'Espagne, i. e. Great Black Spanish.

22. *La Malvoise, i. e. the Malmsey Grape;* is a middle-siz'd Fruit, of a muddy red Colour, its Juice is very rich and soft, the Bunches are large, and it is a great Bearer; this ripens toward the latter End of September.

23. *Malvois Musquée, i. e. the Malmsey Muscadine.* This is a middle siz'd Grape, rather long than round, of a rich, musky Flavour when ripe. This is one of the Sorts of Grapes from which the Madera Wine is made. It ripens late in England.

24. The Red Hamburgh Grape. The Berries of this Kind are large, and of a reddish Colour, covered with a Flew; the Bunches are large, and it is a good Bearer. This ripens toward the End of September, and is a fine Grape. It was brought into England by Mr. Warner of Rotherbith, who hath supply'd many curious Persons with it.

25. The Black Hamburgh, or Warner Grape. This has a middle-siz'd Berry, rather long than round, of a fine black Colour, when ripe; the Juice is very rich, somewhat inclining to a musky Flavour. This ripens about the Middle of September. It was brought into England by Mr. Warner, with the former.

26. *Raisin Suisse, i. e. the Switzerland Grape.* This is preserved only as a Curiosity; the Fruit of this Kind are strip'd with White and Black, and sometimes divided into Quarters of those Colours, and many times half the Bunch is white, and the other half black, and some intire Bunches are white, and others black, so that it appears as if two Kinds had been grafted on the same Root. The Fruit is good for little, but Shew, therefore one Plant of this Kind is enough in a Garden.

Beside those here-mention'd, there are a great Variety of other Sorts, which are the Produce of warmer Countries, some of which have been introduced lately into England; but

as it is uncertain at present, how these will ripen in this Climate, I thought it proper to omit mentioning them in this Place; besides, it is very probable, that many of them may prove the same we already have, under different Names; for as these Fruits are brought from different Countries, so they seldom come with the same Names; and it is this hasty Temper to increase the Number of Sorts, which has confounded the present Catalogues of Fruits.

All the Sorts of *Vines* are propagated either from Layers or Cuttings, the former of which is greatly practis'd in *England*, but the latter is what I would recommend, as being much preferable to the other. For the Roots of *Vines* do not grow strong and woody, as in most Sorts of Trees, but are long, slender, and pliant; so that when they are taken out of the Ground, they seldom strike out again, but shrivel and dry, so that they rather retard than help the Plants in their Growth, by preventing the new Fibres from pushing out; for which Reason I had rather plant a good Cutting than a rooted Plant, provided it be well chosen, and there is less Danger of its not growing.

But as there are few Persons who make Choice of proper Cuttings, or at least that do form their Cuttings rightly, in *England*, so it will be proper to give Directions for this Work in the first Place, before I proceed. You should always make Choice of such Shoots as are strong and well ripened of the last Year's Growth; these should be cut from the old *Vine*, just below the Place where they were produced, taking a Knot of the Two-years Wood, which should be pruned smooth; then you should cut off the upper Part of the Shoot, so as to leave the Cutting about sixteen Inches long: Now, in making the Cuttings after this Manner, there can be but one taken from each Shoot; whereas most Persons cut them into Lengths of about a Foot, and plant them all, which is very wrong; for the upper Part of the Shoots are never so well ripened as the lower Part which was produced early in the *Spring*; so that if they do take Root, they never make so good Plants, for the Wood of those Cuttings being spongy and soft, admits the Moisture too freely where-by the Plants will be luxuriant in Growth, but never so fruitful as such whole Wood is closer and more compact.

When the Cuttings are thus prepared, they should be placed with their lower Part into the Ground, in a dry Place, laying some Litter about their upper Parts, to prevent them from drying; in this Situation they may remain until the Beginning of *April*, (which is the best Time for planting them) when you should take them out, and wash them from the Filth they have contracted; and if you find them very dry, you should let them stand with their lower Parts in Water, six or eight Hours, which will distend their Vessels, and dispose them for taking Root. Then set about preparing the Ground where the Plants are designed to remain, (whether against Walls or for Stan-

dards) for they should not be removed again. But as I intend hereafter to treat in particular about the Planting and Management of *Vineyards*, so in this Place I shall confine my self only to such as are planted either against Walls or Pales, for eating.

In preparing the Ground, you should consider the Nature of the Soil, which, if strong and inclinable to Wet, is by no Means proper for Grapes; but where it thus happens, you should open a Trench against the Wall, which should be fill'd with Lime Rubbish, the better to drain off the Moisture, then raise the Border with fresh, light Earth, about a Foot thick, so that it may be at least a Foot above the Level of the Ground; then you should open the Holes about six Feet Distance from each other, putting one good strong Cutting into each Hole, which should be laid a little sloping, that their Tops may incline to the Wall; but must be put in so deep, that the uppermost Eye may be level with the Surface of the Ground: for when there are two or three Eyes left above Ground, as is the common Method used by the *English* Gardeners, they do all attempt to shoot, so that the Strength of the Cuttings is divided to nourish so many Shoots, whereas on the contrary, it is all employ'd on one single Shoot, which consequently will be much stronger; besides, the Sun and Air is apt to dry that Part of the Shoots which remains above Ground, and so often prevents their Buds from shooting.

Then, having placed in the Cutting, you should fill up the Hole gently, pressing down the Earth with your Foot, and raise a little Hill just upon the Top of the Cutting, to cover the upper Eye quite over, which will prevent it from drying. This being done, there is nothing more necessary, but to keep the Ground clear from Weeds, until the Cuttings begin to shoot, at which time you should look over them carefully, to rub off any dangling Shoots, if such are produced, and fasten the main Shoot to the Wall; which should be constantly fastened up, as it is extended in Length, to prevent its breaking or hanging down. You must continue also, during the *Summer* Season, constantly rubbing off all lateral Shoots which are produced, leaving only the the first main Shoot; and be sure to keep the Ground constantly clear from Weeds, which, if suffer'd to grow, will exhaust the Goodness of the Soil, and starve the Cuttings.

The *Michaelmas* following, if your Cuttings have produced strong Shoots, you should prune them down to two Eyes, (which, tho' by some People may be thought too short, yet I am satisfied, from several Experiments, to be the best Method): The Reason for advising the pruning the *Vines* at this Season, rather than deferring it till *Spring*, is, because the tender Parts of those young Shoots, if left on, are subject to decay in *Winter*, and imbibe some noxious Matter from the Air, which greatly weakens their Roots; so that if they are cut off early in *Autumn*, the Wounds will heal over before the bad Weather,

ther, and thereby the Roots will be greatly strengthened.

In the *Spring*, after the cold Weather is pass'd, you must gently dig up the Borders, to loosen the Earth; but you must be very careful in the doing of this, not to injure the Roots of your Vines; you should also raise the Earth up to the Stems of the Plants, so as to cover the old Wood, but not so deep as to cover either of the Eyes of the last Year's Wood. After this they will require no farther Care until they begin to shoot, when you should look over them carefully, to rub off all weak, dangling Shoots, leaving no more than the two Shoots, which are produced from the two Eyes of the last Year's Wood, which should be fastened to the Wall; and so from this, until the Vines have done shooting, you should look them over, once in three Weeks, to rub off all lateral Shoots as they are produced, and to fasten the two main Shoots to the Wall; as they are extended in Length, which must not be shortened before the Middle of *July*, when it will be proper to nip off their Tops, which will strengthen the lower Eyes. And during the *Summer* Season, you must constantly keep the Ground clear from Weeds, nor should you permit any Sort of Plants to grow near the Vines, which would not only rob them of Nourishment, but shade the lower Parts of the Shoots, and thereby prevent their Ripening; which will not only cause their Wood to be spongy and luxuriant, but render it less fruitful.

At *Michaelmas* you should prune these again, leaving three Buds to each of the Shoots, provided they are strong, otherwise it is better to shorten them down to two Eyes, (for it is very wrong Practice to leave much Wood upon young Vines, or to lay their Shoots in too long, which greatly weakens the Roots) then you should fasten them to the Wall, drawing each of them out horizontally from the Stem; then, in the *Spring*, dig the Borders as before.

The third Season you must go over the Vines again, so soon as they begin to shoot, rubbing off all Dangers, as before, and training in the leading Shoots, (which this Season may be supposed to be two from each Shoot of the last Year's Wood; but if they attempt to produce two Shoots from one Eye, the weakest of them must be rubbed off, for there should never be more than one allowed to come out of an Eye). If any of them produces Fruit, as many times they will the third Year, you should not stop them, (so soon as is generally practised upon the bearing Shoots of old Vines) but permit them to shoot forward till *Midsummer*, at which time you may pinch off the Tops of the Shoots, for if this were done too soon, it would spoil the Buds for the next Year's Wood, which in young Vines must be carefully preserved, because there are no Shoots laid in on purpose for Wood, as is commonly, practis'd on old Vines.

During this *Summer* you must constantly go over your Vines, and displace all weak, lateral Shoots as they are produced, and carefully

keep the Ground clear from Weeds, as was before directed) that the Shoots may ripen well, which is a material thing to be observed in most Sorts of Fruit-Trees, but especially in Vines; which seldom produce any Fruit from immature Branches. These Things being duly observed, are all that is necessary in the Management of young Vines. I shall therefore proceed to lay down Rules for the Government of grown Vines, which I shall do as briefly as possible. And,

First, Vines do rarely produce any Bearing-Shoots from Wood that is more than one Year old; therefore great Care should be taken to have such Wood in every Part of the Trees; for the Fruit are always produced upon Shoots, which come out from the Buds of the last Year's Wood, so that is always upon the same Year's Shoots. The Method commonly practis'd by the Gardeners in *England*, is, to shorten the Branches of the former Years Growth, down to three or four Eyes, at the time of pruning; tho' there are some Persons who leave these Shoots four or five Eyes long, and affirm, that by this Practice they obtain a greater Quantity of Fruit: But this is very wrong, since it is impossible that one Root can nourish forty or fifty Bunches of Grapes, so well as it can ten or twelve; so that what is gotten in Number is lost in their Magnitude; besides, the greater Quantity of Fruit there is left on Vines, the later they are ripen'd, and their Juice is not so rich. And this is well known in the Wine Countries, where there are Laws enacted, to direct the Quantity of Shoots, and the Number of Eyes that those are to have upon each Root, lest by overbearing them, they not only exhaust and weaken the Roots, but thereby render the Juice weak, and so destroy the Reputation of their Wine.

Wherefore, the best Method is, to leave the Bearing-Shoots about four Eyes in Length, (because the lowermost never produce) and three Buds are sufficient, for each of these will produce two or three Bunches; so that from each of those Shoots there may be expected six or eight Bunches, which is a sufficient Quantity. These Shoots must be laid in about eighteen Inches asunder, for if they are closer, when the Side-Shoots are produced, there will not be Room enough to train them in against the Wall, which should always be observed; and as their Leaves are very large, so the Branches should be left at a proportionable Distance, that they may not crowd or shade each other.

In Pruning, you should always observe to make the Cut just above an Eye, sloping it backward from it, that if it should bleed, the Sap might not flow upon the Bud: And where there is an Opportunity of cutting down some young Shoots to two Eyes, in order to produce vigorous Shoots for the next Year's Bearing, it should always be done; because in stopping of those Shoots which have Fruit upon them in *May*, it often spoils the Eyes for Bearing; and this reserving of new Wood, is what the *Vignerons* abroad do always practise in

in their Vineyards. The best Season for Pruning of *Vines* is the End of *September* or the Beginning of *October*, for the Reasons before laid down.

The latter End of *April*, or the Beginning of *May*, when the *Vines* begin to shoot, you must carefully look them over, rubbing off all small Buds which may come from the old Wood, which do only produce weak dangling Branches; as also when two Shoots are produc'd from the same Bud, the weakest of them should be displac'd, which will cause the others to be the stronger; and the sooner this is done, the better it is for the *Vines*.

In the Middle of *May*, you must go over them again, rubbing off all the dangling Shoots as before, and at the same time you must nail up all the strong Branches, so that they may not hang from the Wall; for if their Shoots hang down, their Leaves will be turn'd the wrong Way; which when the Shoots are afterwards nail'd upright, will have their back Surface upward; and until the Leaves are turn'd again, and have taken their right Direction, the Fruit will not thrive: So that the not observing this Management, will cause the *Grapes* to be a Fortnight later before they ripen. Besides, by suffering the Fruit to hang from the Wall, and be shaded with the Closeness of the Branches, it is greatly retarded in its Growth: Therefore, during the growing Season, you should constantly look over the *Vines*, displacing all dangling Branches and wild Wood, and fasten up the other Shoots regularly to the Wall, as they are extended in Length; and towards the latter End of *May*, you should stop the Bearing-Branches, which will strengthen the Fruit, provided you always leave three Eyes above the Bunches; for if you stop them too soon, it will injure the Fruit, by taking away that Part of the Branch which is necessary to attract the Nourishment to the Fruit, as also to perspire off the Crudities of the Sap, which is not proper for the Fruit to receive.

But although I recommend the stopping those Shoots which have Fruit at this Season, yet you should by no means stop those which are intended for bearing the next Year, before the Beginning of *July*, lest by stopping them too soon, you cause the Eyes to shoot out strong lateral Branches, whereby they will be greatly injured. These therefore should be train'd upright against the Wall until that time; when their Tops may be nipp'd off, to give Strength to the lower Buds.

During the *Summer* Season, you should be very careful to rub off all dangling Branches, and train up the Shoots regularly to the Wall, which will greatly accelerate the Growth of the Fruit; and also admit the Sun and Air to them, which is absolutely necessary to ripen, and give the Fruit a rich Flavour; but you must never divest the Branches of their Leaves, as is the Practice of some Persons; for altho' the admitting of the Sun is necessary to ripen them, yet if they are too much expos'd thereto, their Skins will be tough, and they will rarely ripen: Besides, the Leaves being

absolutely necessary to nourish the Fruit by taking them off, the Fruit is starv'd, and seldom comes to any Size, as I have several times observ'd; therefore a great Regard should be had to the *Summer* Management of the *Vines*, where Persons are desirous to have their Fruit excellent and duly ripen'd.

When the Fruit are all gather'd, you should prune the *Vines*, whereby the Litter of their Leaves will be intirely remov'd at once, and the Fruit will be the forwarder the succeeding Year, as has been before observ'd.

Having thus treated of the Management of *Vines* against Walls, &c. I come next to the Culture of such as are planted in Vineyards; but as the Number of those in *England* is small, and the Experience of them not very great, so I shall first subjoin an Account of their Planting and Managing their Vineyards in *Italy* and *France*, and then shall add some Observations and Experiments of my own. And first, I shall insert a curious Account of the Method the *Italians* follow in planting their Vineyards, and making their Wine, which I receiv'd from an ingenious Correspondent in that Country, who hath some Vineyards of his own, and hath been very exact in his Observations upon the different Methods now practis'd by the *Italians* in their Vineyards; which is as follows.

The Method of managing their Vineyards, and making their Vines in Italy.

1. As to the Soil; next to that of *Chianti*, which is in a manner all rocky, they prefer that of the hilly Parts of this Country, which has a warm, stony Bottom, with a loamy Superficies; and next to that, such as has a lime-stone or chalky Bottom, with a reasonably deep Surface of any good Earth; but in the Plains, where the Wines are nothing comparable to those of the Hills and Mountains, they are forc'd to content themselves with any tolerably good Sort of Ground, that is neither sandy nor light to Excess, nor too clayey or binding, though a pretty stiff *Marle* does well enough.

2. As to its Exposure, they chuse one that is due South, or that inclines to the West rather than to the East: And in the Plains, they are oblig'd to be contented, as will be here related, with a North one for part of their Vineyards; which they fence, however, if not naturally cover'd with some Wood or adjacent Hill, with either a good Hedge or a Stone-wall, against the Northern Blasts.

3. The Manner of preparing the Ground for Planting, differs according to the Situation of it; being perform'd one Way when on Mountains; another when on more moderate Hills; and a different, in some respects, to that when on a Plain or Level.

In those Plains which are very mountainous and rocky; as also the Hills, where the Bottom of Stone is found near the Superficies, and is hard, they, with the Help of proper Instruments, or else with Gunpowder, make a Trench of four Feet and a half deep, and three

and an half wide, drawing it from East to West, (and tho' it may be near, yet always somewhat under the Summit or Top of the Mountain, to be cover'd from the North Wind thereby); and with part of the Stones which they raise out of the Foundation, they make a dry Wall (*i.e.* without Mortar) just below the Trench; about twelve Feet below this they make a second Trench in like manner, levelling the Ground between the Trenches, as well as they can, with Mattocks, Crows of Iron, &c. and so proceed till they have finish'd the whole Ground they intend to plant.

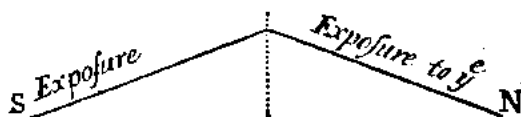
The Use of those little Walls is to keep the little Earth there is from being wash'd away by impetuous Rains: For the carrying off of which, they make proper Channels at convenient Places; so that the whole Plantation, at some Distance, resembles a regular magnificent Pair of Stairs. In which Trenches, at about three Feet distance one from the other, they plant the Cuttings of *Vines*, somewhat slanting, about the Depth of two and a half or near three Feet: Which being dress'd as hereafter related, and when they come to their Bearing, being kept of an equal Height, make a most agreeable Prospect.

When the Ground is hilly, but not very mountainous, they dig a Trench about four Feet and a half deep, and three and a half wide; and then having thrown the Earth to the Northward, they make a second with the Earth whereof they fill the first, and so on, one under and close to the other, till they have finish'd the Ground they would plant, the last serving for a Ditch to carry the Water off: Into which, at proper Distances, they also make little Ditches to convey the Water; and having so done, and thrown the Earth taken out of the first Trench on to the trench'd Ground, and levell'd it so as to give it an even proper Declivity, they plant it with the Cuts of *Vines* in Quadrangles or other Manner, at the Distance of about five Feet and a half or more, as they think most proper for their Ground: If stony, in the manner before related, as practis'd in the Mountains; but if not, then as they do it in the Plains, as will be hereafter describ'd.

When the Vineyard is to be made on a Plain or an exact Level, having stak'd the Part out they design for Walks, and laid out the Divisions they intend for *Vines*, their next Care is, that each of them have a proper Declivity, and that there be good Drains to carry the Water off; in order to which, they make the first Trench exactly in the Middle of the Division, extending from East to West, of the Depth of four Feet and a half, and near four Feet in Breadth, throwing the Earth taken out of it Northward; when laying at the Bottom Stones, Brushwood, Bones, or almost any Sort of Rubbish to raise and drain it, they proceed to the second Trench; with the Earth of which they fill the first, and so on till they have finish'd as far as the second Division extends Southward, laying at the Bottom of every Trench such Rubbish as they can get; and then removing the Earth taken out of the

first Trench over to the South-side already trench'd, they proceed to trench in the same manner on the North-side, as far as the Division extends; when in the last Trench there will naturally remain a Ditch (the Side of which some very curious People wall with a dry Wall) to carry off the Water, whence they take Care to make proper Drains to carry it away.

This being done, they proceed to level this Piece of Ground, giving each Side thereof its proper Declivity, so that it somewhat resembles a Roof that is not steep, or, as they here term it, a Mule's Back, bearing the following Figure: And thus they do to preserve the



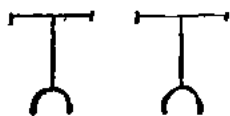
Vines they plant the longer, and to make them render better Wines, whilst those that are planted on the Flat, and on the Borders of Ditches, where they are supported by a sort of *Poplar-Trees*, and serve for the Division of the *Corn-Fields*, though the *Vines* grow to a great Thickness, and produce much Fruit, yet they render a Wine that is good for little, and will not last above thirty-five or forty Years; whereas what is so planted, being tolerably well look'd after, holds good for one hundred and forty, or one hundred and fifty, and in *Cbianti* they will last above three hundred Years, they there accounting those of one hundred Years old as young *Vines*.

N. B. To defray in good Part the Charge of this expensive Culture, those in the Plains, the very first Year, sow a Hole of Melons between Vine and Vine, which they make about ten Inches diameter, and a Foot deep, filling about three-fourths of it with good macerated Dung, and the rest with fine good Earth, (of which that left by Land-Floods is esteem'd the best) in which they put about fifteen or twenty Seeds; which being come up, before they put out the domestick Leaf, they nip the Tops of all but two or at most three of the strongest Plants, which they leave to bear Fruit, and order accordingly. After which they plant Cauliflowers, or Brocoli of Cauliflowers; and this they also do in the Hills so trench'd; but in the Mountains Melons do not well in the Trenches; but Beet-Root is often produc'd, and Cauliflowers.

The Ground being so order'd, where the Vineyard is in a Plain, or on the Hills, they proceed to mark it out with Lines, according to the Distances they would plant at, endeavouring to do it in Rows about three Feet *Vine* from *Vine*, and about four, or four and a half, from Row to Row, but for the most part in a Quadrangular manner, at the Distance of about four Feet one from the other, drawing Lines lengthways and athwart: In the Cross they plant the Cut of a *Vine* in the following manner:

Having an iron Crow of an Inch or better diameter, a little pointed at the End, they therewith make an Hole directly down about three Feet and a half deep; then being pro-

vided with an Instrument, they call a *Crucciolo*, having an Handle of Wood like that of a large Augur, and the Body of Iron four Feet long, and better than half an Inch in diameter, at the End of which there is a Nich something like an Half-moon, making this Figure, they,



after twisting the End of the Cutting, put it therein, and so force it down to the Bottom of the Hole, where they then leave it, and afterwards fill up the Vacancy with fine sifted Earth or Sand, observing to tread the Earth close to the Plants, which otherwise (unless it be stiff Land) is often inclinable to be loose and dry, especially if Rain does not soon follow their Planting; and it is incredible how many *Vines* three Persons can in this manner plant in one Day, viz. upwards of Two thousand.

As the Cuts are of a good Length, there generally remain about two Feet or better of them above the Ground, when planted, and sometimes more. When, as it frequently happens, they find the Earth shallow, so that in the trenching they arrive at prime Rock, or a cold blackish Clay, at the Depth of about three Feet, and therefore they trench not lower, they plant the Depth of two and a quarter, or two and an half Feet; shallower than which they never plant, and even then, if the Bottom be Clay, they will do but little; and if rocky, are apt to suffer in the Summer by dry hot Weather, (tho' if once they strike their Roots in the Rock they do well enough) and yield the best Wine that is made in the Plains; which, however, tho' planted with the same Sort of *Vines* as those of the Mountains, and even of Cuttings brought from thence, never produce near so good Wines as those that grow there, notwithstanding the *Grapes* ripen three Weeks, if not a Month, sooner.

N. B. *This Tillage and Plantation is perform'd at any time between November and March, in dry, but not frosty Weather; since then the frozen Earth in working being naturally thrown into the Bottom of the Trench, where the Vines are to make their principal Roots, it retains such a Frigidity, that they will thrive but badly in it; which will be the Case also if the Ground be labour'd too wet: wherefore this Trenching or thorough Tillage is generally perform'd in February, after the Severity of the Frosts is over, and may be planted at any time between that and April; whilst as for the Cuttings, they are observ'd to do best when planted as soon as cut off in the dressing: but if that Conveniency is not to be had, they may be brought from any reasonable Distance, their Cut-Ends only being ty'd up, and cover'd from the Air with Moss, Straw, or the like; or if from a greater, with some Earth about them, and may be kept, burying the Cut-Ends in the Ground, till such time as they can be us'd: But just before this is done, it is proper to put them in Water for*

twelve Hours or more, since that will influence them to strike Root the better.

It is not of much Importance, that the Cuts be from the best sort of Grapes, though that is best, if easily to be had, but may be from any Vines in the Neighbourhood that thrive well; for afterwards, when they come to their Bearing, you may, with little Trouble, ingraft them with Cuts from Vines of the Sorts you desire; and these will bear some Fruit the very Year they are ingrafted, and most abundantly the next; besides, that the Foot of the Vine or Stock will receive Benefit by this Operation.

5. The Plantation having been made in the manner before related, the first Culture of it is perform'd different Ways; which, as one of them has been practis'd but of late Years, they may be term'd the Old and the Modern.

According to the *old Way*, about a Month after the Planting, when they begin to shoot, they cut off the Tops of the Plants just above the second Eye that is above the Ground, and so let them remain, and shoot out at Pleasure, only after the *Melons*, &c. (which, as is said before, are planted or rais'd in the Vacancies) are gather'd, they dig, and sow, at proper Distances, the Ground with *Beans*, *Kidney-Beans*, *Turnips*, *Beets*, or the like, and let the *Vines* shoot and grow at Liberty till the third Year, (that is, when they have been planted three Years compleat); then opening the Earth about each Plant in *March*, or towards the Beginning of *April*, to the Depth of about a Foot, they, with their Hand, clear away the superficial Roots, and then throw in two Handfuls of good half-consum'd Sheeps Dung, or else of Lupines that have been parboil'd; after which, with a sharp Instrument (either a Bill or strong Pruning-knife) and a steady Hand, they cut off the Head of the Plant just below the lowest Shoot, which is sometimes a Finger or two under Ground, rubbing the Part cut over with some of the contiguous Earth; and then upon its shooting, take the principal Shoot, (gently cleaning away the rest) and fix it with a green Bulrush to a small Stick, to keep it, when tender, from being broken by the Winds, and so let it remain till the next Dressing Season: when having prun'd it, leaving but one Eye, they put a Stick that is something more substantial, of between three and four Feet long, to support it from time to time, tying the Shoot to it till the Month of July, before the Entrance of the Dog-days; at which time they nip off the Head of it, which checks its Luxuriancy, and renders the Fruit, which it will then begin to have in small Bunches of nine or ten *Grapes* each, better and larger, tying the Remainder of the said Shoot to the Stick: In the next Year they order it in the same manner, and so on till the seventh Year after planting, when it begins to give Fruit to purpose; and then, at Dressing, they generally leave but one Head on the most vigorous Plants, and only two Eyes on that, and stake them with substantial Stakes of better than an Inch diameter, and near six Feet long, one of which, or more, goes into the

the Ground, (of which those made of wild Chesnut, the Coppices of which they cut once in seven or eight Years, for resisting both Wet and Dry, are accounted the best): and when they begin to shoot, they tie them to these with the small Twigs of Broom or Osiers, and so visiting them frequently in the Course of the Summer to keep them ty'd, as also to nip off luxuriant Branches, they let them remain till the Dog-days are over; when they clear them of some of their Leaves, that the Fruit may ripen the better.

N. B. In Dressing them after the sixth Year, if they have made more Shoots than one, as most of them will have done, they, as before, cut them all away, unless they have Occasion with them to supply the Places of some contiguous Plants that have miscarry'd; and in moist, warm Weather they lay those Shoots down better than a Foot under the Ground, carrying the Heads of them where they design; and this they term Propagation: The best of the Shoots that they cut off from their Vines of seven Years old or older, they either reserve for any new Plantations that they are to make, or to sell, at about nine Pence Sterling per Hundred.

In Dressing from the seventh Year forward, they reserve the lowest Head they can, provided it be vigorous, and endeavour to keep their Vines as low as may be, for the Fruit to enjoy the warm Reflexion of the Earth after the Sunbeams are gone off from it, to ripen it, and give it Life and Vigour; but not so as to let the Ends of the Bunches touch the Ground, or be so near to it as that they might be dash'd therewith by the Rains, since that would be apt to rot the Grapes; whilst in Chianti (where the Vines, though most abundant in the Product of their Fruit, are not so lavish in their Shoots, but are easily kept in good Order, by a Hand that is tolerably skilful) it is incredible how exactly even the Vines are kept, about the Height of four Feet from the Ground, which contributes to the making the beautiful Prospect before-mention'd.

The Modern Way is as follows:

A Month or thereabouts after Planting, when the young Plants begin to shoot, they prune them just above the first Eye that remains out of the Earth, whereat, when they (as they naturally will) have made their Shoots, towards the Beginning of June, and so that they can discern which, of the several they put out, are the strongest, and appear the most thriving, they carefully and gently, with the Thumb, rub off all of them, except one, which they judge to be the strongest, and, for the most part, the nearest the Ground; which Diligence they renew every eight or ten Days, or oftner, if the Weather chance to be wet, taking away all the new Shoots, which they will abundantly make, ever leaving only the principal Shoot; which, that it may not be prejudic'd by the Winds, or the Feet of the People, (who frequently, during the Progress of the Melons sown between them, must go to nip off the running Branches, and cultivate them, and who at the same time with great

Convenience, do this Work about the Vines) they gently tie, as soon as it is well capable of it, to a small Stick; and if, as it often happens, it proves very luxuriant, they nip off its Top: And this rubbing off of the young Shoots they continue 'till the Month of October, (though unless there be frequent Rains, there will, about the Beginning of August, be few Shoots to ease them of) whilst sometimes the principal Shoots will bear Fruits in small Bunches of five or six Grapes each; but as they are always late, so they will not ripen: Wherefore, that the Strength of the Plant may not be lessened or impaired thereby, they generally crop them off, after which they let the Vines remain 'till pretty early in the Spring, when the intermediate Crop of Cauliflowers or Brocoli of Cauliflowers, is taken off; then, in the Month of February, they open the Earth about the Foot of each Plant, and clear it of its superficial Roots, and manure it in the Manner before describ'd in the Cultivation of those the old Way: The third Year they dress the Shoot so as to leave but one Eye upon it; and afterwards digging all the Ground in the intermediate Spaces, to requite the Expence of Culture, they sow a Sort of Kidney-Beans, which not rising above a Foot in Height, or scarce so much, does not prejudice the young Vines; to which they now give somewhat more substantial Sticks, whereto they continue to tie them, as also to rub off any new Shoots that they make, visiting them for that End; as also to crop off the lavish Tops of the Shoots, only three or four times in the Summer; and the next Year, in Dressing, they bestow substantial Sticks on them, whereto they tie them with Broom-twigs, or small Osiers, when they begin to be in a pretty good State of Bearing, producing two or three pretty large Bunches of Grapes, which (as those of the antecedent Year) ripen well, but come not to the full of their Bearing 'till the fourth or fifth Year: However, they anticipate those ordered the other Way three or four Years; and this is withal the surer Way of the two; since in cutting off the Heads of the others, many are lost; whereas this Way, few, if any, fail.

N. B. What is before said of a Vine's coming to its full Bearing, is only to be understood in respect to the Quantity of the Fruit, a little more or less; for as to the Quality, it is generally esteem'd to be meliorating 'till the twentieth Year, (being duly cultivated) and the Wines coming from it richer and better; and in Chianti they mix not with their best Grapes those of the Product of Vines of a less Age than fifteen or sixteen Years, and pretend they are always meliorating for fifty Years.

The Vines being, by one or other of those Methods, brought to a full Bearing-State, they must be annually dress'd, according to the Vigour of the Plant, and duly stak'd.

In Dressing, to those of moderate Strength and Vigour, they leave but one Eye, or at most two; and to the most strong and vigorous, but three or four at the very most; and

and then they tie them not as they do when they are but one or two, but fixing another less substantial Stick in the Ground, near the main one, to the Top of which, for its better Support, they tie it with an Osier; they bend down and fix the Head thereto in the following Form:



And sometimes when they find some one of a very extraordinary Vigour, and that has two good Heads, they leave them both, and disposing of one in the Manner just before related, the other, having fixed another Stick on the other Side of the principal Stake, and tied it thereto, they in the like Manner bend down the Tie thereto, when it comes to form the following Figure:



This done, they continue from time to time to bind the new Shoots to the Stakes, and to nip off the Tops of them, when too luxuriant, 'till towards the time of Ripening; when the Dog-Days are past, they disburthen them of some of their Leaves, to expose the Fruit, then turning Colour, more to the Sun, and to accelerate the Ripening of it.

N.B. What is said above in relation to the leaving of more than one Head, and the ordering thereof, only relates to such as are in Vineyards on the Plains and Hills; for in the Mountains, as their Stakes are stronger and thicker, they affix some Wood-work to them, on which Frame they run two, and sometimes three Heads, making the Shape of a Wheel.

Here also it may be proper to observe, That all Landlords of Vineyards, at letting them, ever reserve to themselves the Privilege of visiting them at their Pleasure, to see if they are duly dressed, and not more Eyes left to a Vine than there ought to be: For it is possible, in three Years Time, only by Pruning, to spoil the best Vineyard that is, past almost the Power of Art to recover it, and at the same time make it yield much Wine: For it is but leaving, instead of one or two Eyes, five or six, and of three or four, eight or nine, and it will be reduc'd unto so weak and exhausted a State, and the Vines so run into Wood, that it will be past Recovery; and the only Method is to cut the Vines down a Foot or six Inches under Ground, and rear up a new Shoot, which, besides the Time that will be lost in so doing, will hardly, after all, prove effectual. And this Manner of pernicious Pruning the Italians call a *Lascia Podera*, which, in English, is Quit Farm; which is a proper Term enough.

As for the Time of Dressing Vines, if it may properly be so call'd, there is nothing wherein those People differ more; some performing it immediately after the Grapes are gather'd, as in *Carignano* and *Val d'Orno*; others do it at

all times as their Conveniency permits, and the Season is mild and open, (leaving their youngest Vines 'till the last) from *November* to *March*; and in *Chianti*, as the Region is colder, and their Vines late to move, they do it late in the Month of *March*, and even to the Beginning of *April*. Others again do it at twice, in *November*, when they leave an Eye extraordinary, and in *March* they cut off that extraordinary Eye; which last Method seems to be the best; though to have Cuttings for any new Plantation, it can only properly be done in *February* or *March*.

As to Sowing in their Vineyards they also differ as much. In *Chianti*, they leaving a Space of about three Feet from their Vines, from thence to the low Wall, many sow Wheat; and though the Soil seems to be little else but Stones, and such as only can be work'd by a Mattock, yet it bears prodigious Crops, thirteen or twenty for one: Others again, in that Space, will only sow the low Sort of *Kidney-Beans*, *Lentils*, and such low Plants: And others again will not sow any, the least thing at all, as in the general they do not in the Vineyards on the Hills; but in the Plains, after the Heads of their Vines are risen so high, as to be higher than the Tops of Beans, they make no Difficulty, between every Row of Vines, to sow a Row of them, as the most Scrupulous do not, to sow late in *April*, a Row of low *Kidney-Beans*; whilst some of late, laying two Rows of Vines into one, whereof, with strong Stakes and Canes, they make a sort of *Espaliers*, and in the Middle (that is between Row and Row) being near four Feet from each, plant a Row of *Artichokes*, which, they say, being well dung'd in their proper Seasons, Part of the Nourishment going to the Vines, does them more Good than Harm.

As for the Season of digging their Vineyards, they all agree, that the later it is done in the Year, the better it is; wherefore, in the Places where they sow nothing, they let that Work alone 'till the latter End of *April* or Beginning of *May*, when, according to the Nature of the Ground, they do it with the Spade or Mattock. And again, the more especially to kill the Weeds, and forward the Ripening of their Grapes, they stir it with a strong Hoe or Mattock, and, where they can, with a Spade, in the Dog-Days; but in so doing, they take a most particular Care that they touch not any of the Roots of the Vines; for that, if it did not kill them, would at least make them wither and spoil their Fruit.

As for manuring their Vineyards, in all Parts, when they are in a bearing Condition, they practise it but once in five or six Years, when they open the Earth about the Roots, and taking away the small ones, which then may have made towards the Superficies, they throw in an Handful or two of Sheeps Dung, or of that of Goats or Deer; or if any of these are not easily or in sufficient Quantity to be had, then, of parboil'd Lupines, which although agreeable to the Vine, yet being of little

little Substance, must be the ofner repeated, every three Years at least; when they cover it again: and this they perform in the Months of *October* and *November*, that the *Winter Rains* falling thereon, may make it descend to the utmost Fibres of the Roots, and afford them Nourishment.

7. The Season for gathering the Grapes, and making the Vintage is very uncertain, depending upon the Weather that has been the preceding *Spring* and *Summer*, which makes it sooner or later 15 or 20 Days in *Chianti*; when the Season has been good, they begin to cut their Grapes about *Michaelmas*, and in the Plains a Week or ten Days sooner. In this they every where govern themselves according to the Ripeness of their Grapes, and the Prospect of the Weather, aiming to have a perfect dry Season to do it in.

8. The Grapes being of a due Ripeness, and the Weather warm and dry, as soon as the Sun or Wind has dry'd up the Dew that was on them, they cut them, and put them into Piggins, and carry them, if at a Distance, on Mules, or, if near, between two Men, to the Win Fat, and then either bruising them to Mash, in the said Piggins, with a Club, throw them directly therein, or else into a thing resembling a very large Hopper, with a Grate lengthwise; then Boards being placed over the Fat, a Lad with his Feet treads them out, the Juice, Husks, Stones, and Stalks all passing through the Grate into the Fat, and so they continue to do till the Fat (which usually contains from four to five Tuns, sometimes eight, ten, nay, as far as fifteen, or twenty in some large Vineyards, in which there are sometimes several of them) is full, when immediately, or sometimes in a few Hours before they fill it, it will set a boiling, which raises the Husks, Stalks, and Stones to the Top, and these make a thick Crust; and thus it continues boiling for many Days, more or less, according to the Strength of it, till it be fit to be drawn off, which is to be distinguished by the Palate, wherein the greatest Skill in making Wine consists. The Low Wines of the Plains are ready in about ten Days, those of the Hills in about fifteen, of the Mountains in *Chianti* eighteen or twenty, and sometimes more, in the Hastening or Retarding whereof the Weather has some Share; so that when they are near ready, they taste them every eight Hours.

N. B. *The more the Wines boil, the dryer they will be, the Colour deeper; and the less the sweeter and paler: and what is said above, is to be understood of Red Wines, which are the chief Produce of this Country. Whilst to make their strong White-wines or Muscadines, they gather their Grapes carefully, and lay them three or four Days, or more, in the Sun, taking Care to carry them within Doors, or under Shelters in the Night-time, that so no Dew may fall on them.*

And when they are put into the Fat, they let them boil but little, five or six Days at most, and then put them into the Cask, shifting them from one Cask to another, twice or thrice, to make them become fine; and for the Verdea or White Florence, as it is called, they draw it off from the

Fat almost as soon as it begins to boil, and has raised the Crust; and then letting it boil in the Cask into which they have drawn it, thirty-six Hours, or at most, two Days; they shift it into another, and so in a few Hours into a third and fourth, to check and prevent its Fermentation, which gives it the Sweetness it has, but then it is never perfectly fine, though some People both in Italy and England, especially among the Women, are very fond of it.

N. B. *Those Grapes at the End of the Bunches are weaker in Quality, as well as less ripe, than those that grow nigher to the Stalk; and therefore some extreme curious Persons, to make a small Quantity of very choice Wines, do cut them off, and make a Wine by itself, which is much inferior to that which is made of the upper Part of the Bunch. This Practice, though attended with Trouble, may be recommended for a larger Parcel, in such Years as the Grapes are badly ripe, to have some Wine, at least, in Perfection.*

N. B. *Those Persons who value themselves on making the best Wines, and endeavour to keep up the Reputation of their Vineyards and Cellars, in cutting their Grapes, leave the unripe, or those that are infected with Rottenness together, till the last, and with them make a Fat or more, by themselves, of Vin Scauro, or Refuse Wine, which serves for common Use; for which also they mix Water with the Bottom of their Fats, and the Husks, &c. and do make a pleasant, brisk Drink, much preferable to Water-Cyder; but the Weather once coming in warm, turns it eager and undrinkable.*

When any Wines are boiling in the Fat, it raises a Warmth in the Room, which is accounted good in many Distempers, especially for such as have a Weakness in any of their Limbs; to put them into a Fat of boiling Wine; and the Husks, &c. that come out of the Fat, are esteemed very good for the like Purpose.

9. When the Wines are found to be ready, they proceed to draw them off, which are now properly called *Wines*, (before which they are termed *Mosto*, i. e. in *English*, *Wort*) for which Purpose, within three or four Inches of the Bottom of the Fat, there is a Cock fix'd therein; when in small Barrels they carry and put it into the large Buts, which, in *Chianti*, hold, some of them, seven or eight Tuns, but generally two or three Tuns, made of thick Chestnut, the Staves being better than an Inch and a half thick, and more than twice as high as they are long, which they never wash; but having left a Gallon or two, or, it may be, three or four, of Wine in them, when they draw it off the Spring or Summer before: When they are about filling them again, to clean them out, they send in a Lad at the Door, which is made in the Head of the Cask, to do it with a Sponge, and to wash it with some new Wine; and this without wiping off any of the *Argol*, which they think preserves the Wine the better.

In which Casks, which last many Years, (and have *Argol* in them of the Thickness sometimes of three or four Inches) they let them

them remain till they have an Opportunity of felling them, taking Care to keep them full quite to the Bung, with a wooden Stopper. This is what they practise in *Chianti*, where the best Wines are made, and whence, *from those Butts, they are drawn into Flasks, and carried, at the Expence of about a Crown for a Mule Load, to *Florence*, in order for Exportation; but in other Places they draw them off into less Casks, of which Wines, except some *Carnigiano's*, and those of *Val d'Arno*, few or none are exported, but serve for the Consumption of the Country: Some of these have a pleasant Flavour and Briskness, tho' of no great Body, many of which will not keep the *Summer* over, except in cool Cellars, in the Places where made; such is the nice Nature of this Country Wines in general; nor are the choicest *Chianti's* exempt: For at two Seasons of the Year, the Beginnings of *June* and *September*, the one when the Grapes are in Flower, and the other when they begin to ripen, some even of the best Wines are apt to change, especially at this latter Season; not that they turn eager, but take a most unpleasant Taste, which renders them unfit, not only for Drinking, but even to make Vinegar of; and is called the *Settembrine*. And what is most strange, is, that one Cask drawn out of the same Vat shall be infected, and another not; but be perfectly good, and yet both have been kept in the same Cellar too.

As this Change happens not to Wine in Flasks, tho' that will turn eager, I am apt to attribute it to some Fault in filling the Cask, which must always be kept full, which either by letting alone too long, 'till the Decrease be too great, and the Pan or Scum, that there naturally is on all Wine, thereby being too much dilated, is subject to break, or else being broke by hasty filling up, gives it that vile Taste of a rotten Vine Leaf.

But against this there is a very strong Objection, that this Defect seizes the Wine at a particular Season, in *September*, over which if it gets, it will hold good for many Years.

So the Case is worthy the Enquiry of the Naturalists, whilst it is evident, at least for the first Year after it is made, Wines in general are, more or less, affected by the Circumstances wherein the *Vines* or *Grapes* at that time are; and if they get well over the time of the Grapes flowering, will keep good 'till that of their beginning to ripen.

As for the time that the Wines are fit to drink, the poorer sort of People drink that of the Plains almost as soon as drawn off; but from the 11th of *November* may be said to be its proper Season.

Those of the Hills are a very pleasant Drink about *Christmas*, and during the *Spring*; but 'till *June* the *Chianti's* are not esteemed to be fit for Drinking, tho' they are fit for Exportation in Butts in *December*; and in the Flasks and Chests about the Beginning of *February*: if sooner shipped off in that manner, tho' apparently fine, there will be a Sediment in the Flasks.

The Art of Brewing Wines (further than the Throwing into each great Butt, the Quantity of two or three Hatfuls of the choicest Grapes they had preserved, and laid on Mats in the Sun for that Purpose, which were pick'd from the Stalks, and are esteemed proper for their Wines to feed on, and which they call *Governo*) was not known in *Chianti*, (tho' the Hosts here practised something like it, mixing the small Wines of this Country with the strong ones of other Parts; and fining their White-wines with Isinglass, Whites of Eggs, Lime, and the like; and were thought to put Allom into their Red Wines to preserve them, and promote a Thirst in their Guests) 'till, on the breaking out of the first *French* War, an *English* Merchant from *Bordeaux* came into these Parts, with a View to accommodate the Wines which were made in the best Parts of *Chianti*, and were naturally of a true bright Ruby, with a pleasant Flavour, and a silky Softness to the *English* Palates, then in love with the deep-colour'd rough Clarets; who instructed them first in the making of Black Wines, with the *L'Abrusco*, or *Wild Grape*; which being mix'd with the *Chianti's*, gave them a deeper Colour, and a rougher Taste; and being liked in *England*, gave the first Occasion to great Quantities being sent thither every Year in Casks: In the making of which, the said Gentleman was the first that instructed them, for before their Casks were, as above related, very unwieldy. This put them also (there being a Demand for their Wines) upon increasing and enlarging their Cultivations, and making some of them in such Places, as the Exposition was not very proper for; as also to cultivate in Vineyards the said *L'Abrusco*, or *Wild Grape*, and which certainly was the most proper to mix with their other Grapes in the Vat, boiling them together. So all succeeded pretty well, 'till the Year 1607, when the Vintage proving very bad, and there being a great Demand of their Wines for *England*, by mixing the low Wines with the high ones of *Chianti*, which that Season were not very good, they brought these Wines into such a Disreputation, that they have never been able to regain their Credit, tho' they have since, many times, had those that are good.

Whether it be that the Taste of the People is run upon *Portugal* Wines, or some other Cause, they have never been able, as I said, to recover it so as to have any considerable Quantity exported in Casks from these Parts; and the Person that first directed the Affair, had the Dissatisfaction to see his Project miscarry, after it had in a manner succeeded, and himself reap'd considerable Benefit thereby.

At present, therefore, what goes for *England* is chiefly in Chests, and no more Black Wines, as used to be formerly, and these are sent just as they are made; but still in *Chianti*, as they have Cultivations of the *Brusco* Grape, (which, however, is much different from the *wild* one, and becomes much larger and more generous) they continue to mix them with their other Grapes, which gives the great Colour

Colour as well as a Roughness to their Wines, and is agreeable enough to the *English* Taste.

Having thus acquainted you with what I know and can learn in relation to the making and managing of Vineyards, and the Wines they produce, it remains for me to add an Evil, that besides the ordinary ones of Hails, Storms, and Frosts, attends the Cultivation of *Vines* in *Cbianti*; and the Parts contiguous; for in the Plains there is no such Thing; and that is a very small kind of a blackish, or very dark-green Caterpillar, which in the Month of *May* attacks the young Shoots of the *Vines*, when the Grapes are in Embryo, and destroys them; for which, however, they have a most certain Remedy, which is, to make a little Ring of Birdlime round the Foot of each *Vine*, about eight Inches above the Ground, which none of these noxious Insects (which, I presume, proceed from the Earth, and are not brought in the Air, as some of the like are thought to be, though these come generally with an easterly, dry Wind) being able to pass, most effectually does the Business; and as they in that Region come almost every Year, the Trouble of so providing against them is become habitual to the Cultivators.

The Manner of making Wine in Champaign, and how it may be propagated in other Provinces, to bring it to Perfection.

Wine is so delicate a Liquor, and an Aliment so proper to give Strength, and to preserve Health, if us'd with Moderation, that one may very well wonder, that in most of the Provinces of *France*, they make it with so much Negligence, in all those Places, where it might be excellent.

The *Champenois* are exempted from this Reproach, and whether it be from a Delicacy of Taste, or a Desire of making an Advantage of their Wines, or a Facility in rendering them better, they have been always more industrious to make them more exquisite, than those of the other Provinces of the Kingdom.

It is true, it is scarce sixty Years since they have studied to make pale Wine, which is very near White; but before, their Red Wine was made with more Care and Neatness, than any other of the Wines of the Kingdom.

I shall not enter upon the ancient or modern Dispute, as to the Preference between the Wines of *Champaign* and *Burgundy*; I shall content myself with taking Notice of all that the People of *Champaign* have invented, to give the Fineness and Agreeableness to their Wines; and by the Observations that may be made therefrom, it will be easy to see that the same may be imitated in other Provinces, so as to come pretty near that Lightness and Exquiteness.

If these Essays shall give Hopes of Success for the Future, the Wines of those Provinces might be brought to Perfection by Degrees

where they might be delicious, and where they are but too common, because they have never studied to give them that Fineness.

In order to have the Wine excellent, the *Vines* ought to be well exposed to the Sun, especially to the South; and also on the Decline, or in the manner of a little Hill, rather than on a Plain. *Vines* should be well chosen, and should be such as generally produce none but small black Grapes: The Bottom of the Soil should be good; a little stony, and nor naturally moist. The Grain of the Soil of *Champaign* is very fine, and has a singular Quality, that is not found in the other Provinces.

As these Kinds of Lands are light, there is Occasion to dung them from time to time, and to lay on new Earth. But the Dunging ought to be very sparingly done; too much of it will render the Wine soft and insipid, and apt to be ropy. It ought to be commonly Cow-dung, because that is not so hot as Horse-dung: In strong Lands it may be mingled with Horse-dung and Sheeps-dung, provided that the Horse-dung be so rotten, that it may be reduced to a Powder, and that there be but one half as much as of the Cow-dung, otherwise it would burn the *Vines*. Let it be laid in a Trench or Pit, and mix one Layer of Dung and another of new Earth, and let it lie and rot during a whole Winter; and towards the Month of *February* take from thence half a Basket for every *Vine*, especially for each new Plant, to help them to push forth. It is sufficient for a Vineyard to be dunged once in eight or ten Years, or an eighth or a tenth Part every Year.

After the Dung has been carried, the *Vines* ought to be opened round about, and a little Trench to be made round the Foot of the *Vine*, and to be buried there at a proper time.

Divers Persons leave it there many Weeks before they bury it, but this is not the best Way; for the Air, the Cold, or the Sun, will be apt to dissipate the most subtil Substance of it; but when it is neither too cold nor too hot, it may be left open eight or ten Days, to exhale its ill Savour, especially the Dung of Sheep.

They give to a *Vine* four ordinary Dressings, according to their Seasons; but it is proper to take Notice of one Thing, which is scarcely observed in *Champaign*, which is, that they cut their *Vines* in the Month of *February*, and even in *January*; instead of which, they ought never to begin to cut them till after the 14th of *February*: When they are cut before, they push forth sooner, and are exposed to Injury, and are sometimes kill'd, if any Hoar-Frosts come presently after they have been cut. But when they stay till after the 14th of the Month of *February*, there is no Danger of their being injur'd by the Frosts.

The Covetousness of *Vignerons* leads them to undertake the Cultivation of more *Vines* than they well can manage; and for this Reason they cut their *Vines* in *January*, which does
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an infinite Injury to them, and to the greatest Part of Plants, which they are sensible of for many Years.

In *Champaign* they cultivate two Sorts of *Vines*, which they call the *High Vines* and the *Low Vines*. The *High Vines* are such as they leave to grow in those Places that are less fine, to the Height of four or five Foot: The *Low Vines* are those which they do not suffer to grow above three Feet high; these they interr, or *ravale*, according to the Country Term, every Year, so as to leave but a little of the End to appear, which is repeated every Year.

The *High Vines* produce plentifully, and give often seven or eight Pieces of Wine an *Arpent*: The *Low Vines* produce but little; but then the Wine is much more delicate: They often do not give above two Pieces of Wine an *Arpent*, oftentimes less, seldom three, but much seldomer four.

In order that the Wine may be the finer, all the *Vines* which give the white Grapes must be taken away, and those also that give the large black Grapes; but one need not pluck these up, but graft them.

But sometimes these Grafts will not succeed; which being observed, they must be pluck'd up, and new ones that have a Root, set in their Room, which they choose out of the Nurseries, that are common in the Country. They ordinarily purchase these Plants for a Pistole a thousand.

A private Man, that has a great many *Vines*, may make himself Nurseries.

These Plants that have a Root are put into the Earth, in the Middle of a great Hole, about a Foot deep, which they make with a Stake, or strait Mattock, or Pick-axe; and these produce sooner than the others, which have no Root: A Plant that has a Root begins to give Wine, a little, the third Year, indifferently the fourth and fifth, and in abundance in the following Years, and so for above sixty Years.

These new Plants ought to be dung'd the second Year, and in the sixth Year, and afterwards in the eighth and tenth Year, as other *Vines*.

It will be to the Purpose, every Year, to pull up Part of the old Plants, which take up Room, and produce little or nothing; and by this Means a Vineyard will be constantly renew'd, as one may say, and in a perfect good Condition.

When there are Dews or Humidities in *May*, *June*, and *September*, the *Vignerons* must not be suffered to enter the Vineyards in a Morning; for the Dews of these Months are commonly very cold, if the Sun do not draw them up; which burns the Leaves of the *Vines* which it touches, before they are drawn up.

It is very essential not to enter the Vineyards at the Time when there is Hoar-Frost or Showers attended with Frost, for this will certainly kill the *Vines*.

The Vineyards must be weeded now and then, and if there be any Beetles, which are pernicious Animals to Plants, they must be

pick'd off, and put into Sacks, and burnt at some Distance from the Vineyard, and the Ashes buried.

About the End of *June*, and also of the Month of *May*, according as the Vineyard is advanced, it is necessary to cut off the End of each Twig, that the Plant may grow no more in Height, and that it may convey all its Nourishment to the Grapes: It is enough, if it have two Feet and an half, or three at most, above the Ground; all the rest is to be cut off, as must also the Tops or Ends of the young Shoots, which proceed from the Bottom or Sides of the Stocks. This ought to be done twice, thrice, or four times in a Summer, according as the *Vines* put forth, more or less, in certain Years.

In the Season, they put a Prop to every *Vine*, to support it; they ought to be chosen, as much as may be, of Oak, and to procure them of the Quarter or Heart thereof, if you are willing to go to the Charge of it. These will last above twenty Years, and when they are once made sharp, they will always keep so; for when they begin to rot, they perish equally throughout, and remain always pointed. The other last scarce four or five Years; and the Masters must have an Eye over the Servants when they sharpen them yearly, that they do not cut them too much, and make them too short, and that they do not break a great many that might serve; for oftentimes in cutting off that which is rotted, they cut off two or three Inches of that which is sound, or that which is good, which prejudices it as to Duration. They call these Props, *Foot Props*.

When a Vineyard has been cultivated and managed for the Year, after the accustomed Manner, and the Vintage-time approaches; when they have made Choice of and prepared a new Cask that will contain it; and when the Press has been wash'd, cleans'd, and greas'd, you must be very watchful to find when the Grapes are come to Maturity. For if the Grapes are too ripe, the Wine will not be sufficiently strong; if they are too green, it will be hard, more difficult, and longer before it is fit to be drank.

In the Provinces of *Languedoc* and *Provence*, the Grapes have too large Stones; they have too many white ones, they suffer them to be too ripe, which gives them over-much Liquor; they let their Stocks grow to be too old, and do not renew them often enough: They are planted, for the most part, upon too good Bottoms, or too moist, and have not an Aspect of the Sun good enough.

To make an excellent Wine of the first Pressing, having first well examined the Maturity of the Grapes, you ought to endeavour not to gather them but on Days that are very dewy, and in hot Years, after a little Rain, when you can be so happy as to have it; as the Grapes are not ripe till towards the End of *September*, and sometimes the Beginning of *October*, Dew is rarely wanting in Vintage-time. This Dew gives the Grapes a Flower or

or *Farina* on the Outside, which they call *Azur*, and inwardly a Freshness, which causes that it does not heat very easily, and that the Wine is not colour'd.

It is very lucky, if there chances to be a misty Day in dry Years, which now and then happens: The Wine is not only thence more white and delicate, but the Quantity is by much the greater, being augmented by near one fourth Part: A private Person who has but twelve Pieces of Wine, in gathering his Vintage in a Morning which has the Sun without Dew, will have sixteen or seventeen if the Morning, be misty, and fourteen or fifteen if it has no Mist, but yet has a good Dew: The Reason of this is, that the Dew, and, above all, the Mist, renders the Grapes tender, so that the Whole, in a manner, turns into Wine.

The Wine produc'd from the Grapes that have not been warm'd the Moment they are cut, will still remain much paler; whereas when the Sun has warm'd the Substance of the Grape, it will become more red by the Motion of the Parts; but the Quantity will be lessen'd either by reason of Transpiration, or because the Rind has been thicken'd and harden'd by the Sun, whereby it yields its Juice with more Difficulty. This, Experience hath taught, is of so much the more Concern, by how much the more certain it is.

They agree in *Champaign*, that the Wine which they call *River Wine* is ordinarily paler than that of the *Mountains*, but they do not give the Reason for it. I believe the Vineyards that are near a *River* enjoy all the Night a fresh Air, which the *River* exhales; whereas the Vineyards of *Mountains* don't respire, during the Night, that Warmth, which proceeds from the Exhalations of the Earth, and it is that which makes the Colour more or less; also when the Years are very hot, they cannot, either to those of the *River* or of the *Mountains*, warrant the Colour; and when the Years are cold, neither the Wines of the *Mountains*, nor those of the *Rivers* are colour'd: the Reason is the same, because the Wines of the *Rivers* are more soft, forward, and sooner fit for drinking, than the others that are harder, more heady and later fit: They call the Wines of the *River*, *Auvillé*, *Ay*, *Epernay*, *Cumieres*, *Pierry*, as *Fluery*, *Damery*, *Vanteuil*, and others; but *Verzenay*, *Sillery*, *St. Thierry*, *Mailly*, *Rilly*, and some others are of the *Mountains*; these latter Wines keep as well as the first, and, in good Years, they keep equally well in Bottles for five or six Years.

They gather not all the Grapes without Distinction, neither, at all Hours in the Day, but they chuse the ripest and bluest; those are the best, and make the most exquisite Wine, whose Berries grow not too close together, but are a little separated, whereby they ripen perfectly well: For those that are close join'd together, never ripen thoroughly: They cut them with a small crooked Knife, with as much Neatness, and as little of the Tail as they can, and they lay them very gently on the Baskets, so as not to bruise one Grape.

With thirty Grape-gatherers they will run over a Vineyard of thirty Arpents in three or four Hours, to make one first Pressing of ten or twelve Pieces.

In wet Years, great Care should be taken not to put any Grape that is spoil'd into the Baskets; and at all times you must be very careful to cut away the rotten Grapes, or those that are bruised, or quite dry'd up; but you must never stone them.

They begin the gathering of Grapes half an Hour after Sun-rising; if the Sun is not clouded, and it is a little hot, about nine or ten o' Clock they leave off gathering, and make their *Sac*, which is one of the first Pressing; because after this Hour the Grape being warm, the Wine will be of a red Colour or Teint, and will be a long while very heady.

Upon these Occasions they get a great Number of Gatherers, to be able to make up a *Sac* for a Pressing in two or three Hours: If it be overcast, they may gather the whole Day, because the Grape will preserve its Freshness upon the Stock.

The Gatherers and the Pressers ought to take great Care that the Grapes be neither foul nor heated when they are press'd; and also, that the Grapes have their Flower under the Press.

When the Press is near the Vineyard, it is easie to prevent the Wine from having a Colour, because the Grapes may be carry'd gently and neatly in a little time; but when they are two or three Leagues off, they being oblig'd to send the Grapes in Casks, and in Carts, to press it as soon as may be, it is hardly to be avoided but that the Wine will be colour'd, except in very moist and cold Years.

This is a certain Principle, that when the Grapes are cut, the sooner they are press'd, the more pale and delicate is the Wine; for by how much the more the Wind stands upon the *Marc*, the redder it is; so that it is of great Importance to hasten the Gathering of the Grapes, and Pressing of them.

The Presses of *Champaign* are very commodious; the particular Persons that have many Vineyards of their own, have them in or near the same Vineyards: In small Places the Presses are *Bannaux*, which are of different Sizes and Fashions. An exact Description of these several Presses will be inserted in the Article of *Wines*.

The small ones are about seven Feet and a quarter, the middle ones about ten or twelve, the large ones fifteen or eighteen; the least, which they call *Etiquets*, cost seven or eight hundred Livres; the second, which they call a *Cage*, or a *Teissons*, about two thousand Franks; the large ones a thousand Crowns, and sometimes more, according as the Wood is cheaper or dearer in certain Places: In *Languedoc* and *Provence*, where Wood is scarce, these Sort of Presses cost a very great Price, and but few Persons are in Circumstances to be at the Charge of them.

When the Grapes have been put under the Press or on the *Marc*, they put three great Rods or Poles of ten or twelve Inches round upon them one at either End in Length, and the third in the Middle on the same Side:

These at the Extremities serve to describe the Lines which they ought to follow with their Cutting-shovels, in cutting the *Marc*, the Substance squeeze'd on two Sides: After the Cut is made, they lay upon these Poles, and on the Grapes, Planks of the Size of the Press; and upon these Planks half Beams of eight or nine Inches square, which they call *Moyaux*, at a Foot distance one from the other; they put four or five Rows of these *Moyaux* across one upon another, which elevates it with the Bag about four or five Feet; and they let down upon the Whole three or four great Beams of an immense Weight, which are plac'd in the Middle of the Press across, and borne up at one End by two strong Side-beams, which are sunk fifteen or twenty Feet into the Ground, and which are fasten'd to the Bases which cross them; at the other End there is a *Cage*, as they call it, or a Wheel with a Skrew to raise or lower these great Beams upon the *Moyaux*, and thus to press the Grapes: Then they presently raise, by the Means of a Skrew, the End of the Trees on the Side of the Wheel or of the *Cage*, which lowers the other End of the Cheeks or Side-Beams; then they drive with a great Mallet two or four great wooden Quoins between the Notch which is in the Side-beams or Cheeks, and these Beams are also lower'd to keep them in their Position, and to prevent them from rising; and after this they lower the other End by the Aid of the Skrew, which serves also to raise it.

They use in these Presses large Steel Shovels about a Foot in Breadth, and one and a half in Depth, very heavy and sharp at the Bottom, to cut the *Marc* of the Grapes easily at the four Sides.

The first time they lower the great Beams upon the Grapes, they call the Wine that runs out, the *Wine of Goutte*, because it is the finest and most exquisite in the Grape: This Wine is very thin, and has not Body enough; they call this first Pressing *l'Abaissement*: This must be done with a great deal of Dexterity and Briskness, that the Beams may be rais'd immediately, to send back to the Middle instantly the Grapes which are slipp'd to the Sides all round about, to press them briskly the second or third time. They call these two other Lowerings of the Beams, the first and second Cutting: They must be done in less than an Hour, if you would have the Wine very pale, because Time is not to be given to the Grapes to heat, nor the Liquor to remain upon the *Marc*.

They ordinarily mingle the Wine of the *Abaissement*, or Lowering with that of the first and second Cut; and sometimes, but very rarely, with that of the third, according as the Years are more or less hot, and thence they call a Wine of the first pressing, Fine.

Some preserve one or two *Carteaux* of the first Taste, which is that of the Lowering, by itself; but it is too small or thin, and has not a sufficient Body for Wine.

There are some skilful Persons who pretend, that the Lowerings of the Wines ought not to be mix'd but with those of the first Cut, be-

cause that is much more delicate than that of the second and third; and that besides, there is time enough to mingle them afterwards, if they are found to be too fine, and pale enough, and the rather, because there is no Remedy if it be done at the first.

At every Cut they raise the great Beams, and they take away all the *Moyaux* with the Planks, and the Rods that are immediately upon the Grapes, or upon the *Marc*; with these Steel Cutting-Shovels they cut the *Marc* on four Sides, and they cast down with their wooden Shovels that which is cut, and they spread it even all over the Square to the End, that it may not disperse so easily; that is to say, in those Presses which they call *Etiquets*; they take Care that the Wheel which is upon the Middle may be made bear, especially upon the Rammer over all the Breadth, in such manner that the Bag may be equal.

Instead of the Presses, [a *Cage*] or *Teiffons*, as the Beams bear more upon the Side of the Wheel than on the Sides of the Corners, there must needs be more of the *Marc* when the Bag is placed sloping toward the Wheel than toward the Side of the Quoins, as will be easily comprehended by viewing the Descriptions of the different Presses. It is also to be observ'd, that every time they cut the Grapes or the *Marc*, they tie up the Bag, because it has always a certain Elevation, in such sort, that it is one-third less at the End than at the Beginning.

The second Cut is more plentiful than the Lowering and the first, because the Grapes begin to be well bruised, and they do not slip so much to the Sides.

The Wine strains from the Press into a Punchion, having the Head stav'd out, or some other large Vessel prepar'd for the Purpose, and sunk into the Ground on the Fore-side to receive it; it appears to be drawn a little upon the Red, but it loses this little of its Colour according as it is boiling, and as it clarifies itself in the Tun; and it remains perfectly white, especially when they have pressed the two first Cuts with much Dispatch; but principally when they have gather'd the Grapes during the Dew, or in a shady Time. Altho' these Wines are white, they call them grey, because they are made only of black Grapes.

If the Year be hot, and the Wine of the third Cut has a Colour, it must be mingled, not with that of the foregoing, but with that of the fourth, and sometimes, though but very rarely, with that of the fifth. They are not in so much Hast for these Cuts as for the first; they make an Interval of a good half Hour between the one and the other: The Wine that comes thence has more of Colour than this, which they call the *Partridge's Eye*; or, the *Wine of the Cut*: It is a strong Wine, pleasant, fine, good for an Ordinary, but is better when it is old.

When the Wine of the fourth Cut is too deep, they don't mingle it with Wine of the Cut, but they observe to mingle it with Wine of the fifth, sixth, or seventh Cut, which they call *Wine of the Press*, which is too red, pretty hard,

hard, but fit for Household-drinking : But when they are not in haste, they leave an Interval of an Hour and a half between every one of the three last Cuts ; as much to give time to the Wine to strain insensibly, as to give the Presses time to sleep, or to rest themselves ; for the Fatigue is very great, they being oblig'd to carry it on Night and Day for about three Weeks. The Pressers of *Champaign* press the Grapes so hard, that after they have done, the *Marc* is as hard as a Stone : They put this *Marc* into old Casks, with the Heads out, and they sell it to People, who draw from it an *Aqua Vita* of a very bad Taste, which they call the *Aqua Vita* of *Aixne* ; but it is good for a great many Purposes.

Those who have many Vineyards, also make two, three, or four first Pressings of fine Wine, by chusing always the most delicate and ripest Grapes for their Firsts : These are always much superior the one to the other for Goodness and for Price ; so that if the Wine of one of the first Pressings sells for six hundred Livres a *Queüe*, that of the second will not sell for above four hundred and fifty, and that of the third two hundred and fifty, although all the Wines are of one and the same Vineyard.

In every first Pressing there is ordinarily two-thirds of fine Wine, one half third of Wine of the Cut, and one half third of the Wine of the Press : Thus one *Cuvée* of five or six Pieces of Wine will consist of nine or ten of Fine, three or four of *Taille*, and two or three of the Press.

Of the common Black Grapes, which remain after one second or third *Cuvée*, they make one with those that are not very ripe, and which they call *Verderons* : They make of the Whole a Wine pretty high colour'd, which they sell to the Country People, or that serves for their Domesticks : They also leave these Grapes two whole Days in a great Tub, before they press them, to the End that the Wine may be the redder ; and they mingle all that comes from the different *Tailles* of this Vintage.

The white Grapes don't come into this *Cuvée* ; they leave them upon the Stock till towards *All Saints-Day*, or sometimes till towards the eight or tenth of *November*, at which time the Mornings are cold, to make of it a *Vin-Bourra*, as they call it, (*i. e.* a new and sweet White Wine, that has not work'd) which they sell while it is quite hot.

This Wine is still the better when the Grapes have borne the white Frosts of *October* and *November*, or at least very cold Mornings : A little Rottenness in these Grapes does us no Harm ; you need only take Care to give the Wine leave to throw out the Filth by the Ferment, and purify.

This White Wine may be mingled with the Wine of the *Taille*, if you will, if you have not an Opportunity of selling it presently after it is boil'd. This makes a very good Wine to drink, is pretty pale, and has a good Body.

All these fine Wines ought to be put into a new Cask, as also should those of the *Taille* ;

but the Red Wines, the Green, and those of the Press may be put into an old Cask, but it ought to be a good one.

You must never do the Tuns over with Brimstone ; you should only wash them in common Water, a little time before they are fill'd, and give them time to drain well : Some Handfuls of Flowers or Peach-leaves may be mingled with the Water ; and they pretend that this will do the Wine good.

In *Champaign* they rarely put it in any thing but Pieces [*Cartoux*] and Cades.

The River Measure is different from that of the Mountains : The Pieces of the Rivers contain about two hundred and ten *Paris* Pints ; the *Carteau* an hundred and ten ; the Pieces of the Mountains contain about two hundred and forty Pints, at the least two hundred and thirty *Paris* Measure, and the *Carteau* an hundred and fifteen or an hundred and twenty.

They mark regularly, with Chalk, every Piece and every *Carteau*, which denotes the first, second or third *Cuvée* ; the Wine of the Cutting of the Press, the White Wine and the Green, they also write the Name of the Vineyard from whence the Grapes came.

Some few Years since, some private Persons in *Champaign* have attempted to make Wine as red as that of *Burgundy*, and they have succeeded pretty well as to the Colour ; but, in my Opinion, these Sorts of Wines do not come up to those of *Burgundy*, in that they are not so soft, nor so agreeable to the Palate : Nevertheless many Persons call for these Wines ; and some esteem them the best.

And as those Grey Wines are a little fallen, there was made, the last Year, a great deal of Red in *Champaign*. These Wines do well for *Flanders*, where they are frequently sold for those of *Burgundy*.

Of all these Wines, there is none better for Health, nor more agreeable to the Palate than the Grey Wine of *Champaign*, of the Colour of a *Partridge's Eye*, or the Wines of the two first *Tailles* of a first Pressing in pretty hot Years.

This Wine has a Body, a Tartness, a Headiness, a Balsamickness or Perfume, a Quickness and Delicateness, that exceeds all the most exquisite ones of *Burgundy*.

And that which should engage one to drink it, is its Lightness, which makes it strain and pass quicker through the Body than any other Wine in the Kingdom. It is a Mistake to be of Opinion, that the Wine of *Champaign* can give the Gout. I have scarce ever seen one gouty Person in this whole Province ; and there need be no better Proof.

To make good Wine in *Champaign*, the Black Grapes ought to be gather'd in the Heat of the Day ; Care is to be taken to chuse them well, and not to mingle with them the Grapes of the Vine-Arbour, nor the Green ones, or those that are partly rotten ; to let them be two Days in one Tub, where the Liquor grows red by the Heat that it contracts there : Some Hours before it is put into the Press, it ought to be trampled with the Feet, and the Juice to be mingled with the *Marc* :

Without

Without, this the Wine will not be of a sufficient Redness. If it be let stand more than two Days in the Tub, it will taste too much of the Stone. If it be mingled with the Wine of the Press, it will be too thick, too hard, and too unpleasant.

If they would continue to make good Red Wine in *Champaign*, they must trample the Grapes as in *Burgundy*, and leave them for three, four or five Days in one Tub: But as the Red Wine of *Champaign* never equals the Goodness of that of *Burgundy*, the Reputation of the Grey Wines will sink in a short time, and the Publick will insensibly lose the Relish of it, and this will bring an infinite Detriment to the Province.

The Wine of the first Pressing being finish'd, and the Vessels mark'd, they set them in a Row in a Cellar or Court-yard. Those who have a great deal of Wine, and are good OEconomists, take great Care to gather the Scum that comes out of every Vessel, while the Wines ferment, by the Means of a kind of Tin Funnel, made bending downwards, which lets the Scum fall into a wooden Bowl, which is placed between two Casks; they afterwards put these Scums into the Wines of the Press: but, nevertheless, there are but few that use this Piece of OEconomy.

They let these Grey Wines stand to ferment in the Casks ten or twelve Days, because these Wines throw out their Ferment so much the more or less slowly, by how much they have more or less Warmth, or as the Years are more or less hot.

After the Wine has done fermenting, they stop up the Vessels at the great Bung-hole, and leave on the Side forward an Opening, about the Bigness of a *French Farthing*, by which one may put in his Finger; this they call *Le Broqueleur*: And they stop this up ten or twelve Days after, with a wooden Peg of about two Inches long, for the more readily taking it out and putting it in.

All the while the Wines are fermenting, the Vessels are to be kept almost full, to give them an Opportunity of casting out all that is impure. In order for this they must be filled up for three Days, within two Fingers of the Bung; after they have been bung'd up, they must be filled up every eighth Day, at the little Hole, for the Space of two or three Weeks more; and after that, once a Day for fifteen Days during one Month or two; and after that once every two Months, as long as the Wine remains in the Vault, if it be there for Years.

When the Wines have not Body enough, or are too green, as it often happens in moist, cold Years, and when they have too much Liquor, as in hot and dry Years; three Weeks after the Wines have been made, they must be rolled in the Casks five or six Turns, to mingle them well with the Lees, and this must be continued every eight Days, for three or four Weeks; this Mingling of the Lee with the Wine being repeated, will strengthen it, soften it, ripen it, and render it more forward, and make it fit to drink, in as short

time as if it had been transported from one Place to another.

These Wines must be let stand in the Cellar till towards the tenth of *April*, when they carry them down into the Vault; but as soon as it begins to be cold, they are to be carry'd up again into the Cellar: It is of Consequence to be observ'd, upon this Subject, that the Wines ought always to be in cool Places, and never to suffer the Heat. And as the Vaults are cool in the *Summer*, and warm in the *Winter*, as soon as it begins to be hot, the Wines must be carry'd down, whether they be in Pieces or in Bottles, into the Vaults; and when it begins to be cold, they must be carry'd up into the Cellar.

There has been nothing better invented and more useful than the Manner of Drawing off Wines. Certain Experience convinces, that it is the Lee that spoils Wines; and that they are never better nor more lively than when they have been well drawn off, whether you would Bottle it or keep it in the Pieces: It ought always to be drawn off out of one Vessel into another, at least twice into another Vessel well wash'd, leaving the Lee in the former.

You should draw off the Wines the first time towards the Middle of *December*; the second towards the Middle of *February*, and to glue them in *March* or *April*, eight Days or thereabouts before you bottle it. For every Piece of Wine you must have of Fish-glue, that is the whitest, of the Weight of a Crown of Gold, weighing two Deniers fifteen Grains, or sixty three Grains. They take so many times the Weight of a Crown of Gold as they have Pieces of Wine to draw off; they put this Quantity of Glue in one or two Pints of the same Wine in a Bucket for a Day or two, to give it time to dissolve; others put it in a Glass, or a Pint of Water, according to the Quantity, in order to hasten its dissolving, which is always difficult to be done; some mix it in a Chopin or Pint of Spirit of Wine, or excellent *Aqua Vita*: When the Glue is grown soft, they handle it well to divide it, and distribute it; then, when the Parts begin to separate, they put in the Bucket or the Vessel in which this Dissolution is made, so many Pints of Wine as they have Casks or Pieces to draw off; then they handle the Glue well again, and pass it through a Strainer, the Holes of which should be very small: They often pour in of the same Wine to dilute it well; and when there remains nothing in the Strainer, they pass all the Liquor over again through a Linen-cloth, and squeeze it very well, and afterwards they put one good Pint or less into each Cask, and half into each *Carteau*.

They stir the Wine in the Piece with a Strick about the Middle, without suffering the Strick to go any lower. It is sufficient to stir the Wine for the Space of three or four Minutes.

A certain private Person has newly contriv'd a quicker Method of dissolving this Glue: After it has been steep'd one Day in Water, he melts it in a Skillet upon the Fire, and reduces

duces it to a Ball, like a Bit of Paste, and afterwards puts it into the Wine, where it distributes itself with less difficulty. After what manner soever it be dissolv'd, Care ought to be taken, not to put in too much Liquor, and not to put more than a proportionable Quantity of Water or Wine to that of the Isinglass.

The Isinglass works its Effect ordinarily in two or three Days; tho' sometimes it does not clarify the Wine in six or eight; but nevertheless you must wait till the Wine is clear before you change the Vessel. In the Winter the Seasons are oftentimes so improper for this, that there is a Necessity of putting Isinglass a second time into the Piece, but then you must not put in more than the Quantity before mention'd: But when it freezes, or the Weather is clear and cold, the Wine will clarify itself perfectly well, and in fewer Days: It has a Colour more lively and brilliant, than when it is fined and drawn off in faint, moist Weather.

As soon as the Wines are clear, they are to be drawn off, and the Vessels chang'd. Four or five new Casks are sufficient to draw off two or three hundred Pieces of Wine; for when they have empty'd one Piece, they take out the Lee, and put it into the old Casks, wash it, and it serves to draw off another into it.

Nothing is more curious than their Contrivance in *Champaign*, to shift their Wines without displacing their Casks. They have a Leathern Pipe, like a Gut, four or five Feet long and about six or seven Inches in Circumference, well sew'd with a double Seam, that the Wine may not run through: There is at both Ends a Cannon or Pipe of Wood, about ten or twelve Inches long, and about six or seven in Circumference at one End, and about four at the other: The great End of each Pipe is set in a Leathern Pipe, and well bound with strong Twine on the Outside, that the Wine may not run out: They take out the Bung that is at the Bottom of the Tun that they would fill, and drive the Wood of the Pipe in with a wooden Mallet, which they beat upon a Sort of Chin-cloth, that is to each of these Pipes, which being rais'd about two Inches from an Inch or less of the great End, and which loses itself insensibly in going towards the small End; they set a large Syphon of Metal below the Cask they would empty, and also put into this Syphon the small End of the other Pipe of Wood, which is fasten'd to the Leathern Pipe, and afterwards open the Syphon; and without the Help of any Person, almost the Half of the full Vessel passes into the empty one by the Weight of the Liquor; and when it is come near the Level, and will run no longer, they have recourse to a kind of Bellows, of a very particular Construction, to force the Wine from the Cask they would empty, to pass into that they would fill.

These kinds of Bellows are about three Feet long, and a Foot and half broad; and are made and shap'd in the common manner to about four Inches of the small End; but

from this Distance the Bellows have three or four Inches in Breadth. In the Inside of this Place, the Air passes only through one great Hole of an Inch bore: Near this Hole, on the Side of the small End of the Bellows, there is a Piece of Leather, like a Tongue or Sucker of a Pump, which is fasten'd there, and lies close against the Side of the Hole and the Mouth, when the Bellows is lifted up to take in the Air, that the Air which has pass'd once thro' this Hole, and which has entred into the Cask, cannot return back into the Bellows; which takes not back a new Air, but by those Holes below to fill it again.

The End of the Bellows is different from that of others, being closely shut up with a Nozle of Wood of a Foot long, which is jointed in, gluc'd, and very strongly fasten'd by good Pegs at the End of the Bellows, to conduct the Air downwards: This Nozle is round and thick without, about nine or ten Inches in Circumference at the Top, and diminishes insensibly towards the small End, that it may enter conveniently into the Vessels by the Bung-hole, and also to shut it up so close that the Air can neither get in nor out any way.

This Nozle enters for this purpose two Inches, near the Level at the End of the Bellows, and is made in a half Round at the Top, that it may be beaten in with a wooden Mallet, and forc'd into the Cask: There is, about two Fingers Length below the upper End of this Nozle, a Hook or Brace of Iron of a Foot long, passing through an Iron Ring, which is fasten'd with Nails to the Nozle, in order by this Hook to fasten the Bellows to the Hoops of the Cask, without which the Force of the Air, would drive the Bellows out again by the Bung-hole, and the Operation of emptying the broached Vessel would not be perform'd.

The Mechanism of these Bellows thus describ'd is easy to be conceiv'd: The Air enters by the Holes below in the common manner: It advances towards the End, according to the Degree that the Bellows are press'd: There it meets with a Pipe that causes it to descend downwards; but to hinder it from rising up again, as it would do, when the Bellows were open'd to give it a new Air, there is in this Space a Sucker or Tongue of Leather, which, as has been said, is the inside of the Hole at about three or four Inches from the End of the Bellows which shut up the Hole according as you would have it take in again a new Air; this new Air pushes still gently, in pressing the Bellows in the Pipe, because this Tongue opens according as it is forc'd by the Air; thus there continually enters a new Air into the Cask, without being able to get out, because it finds itself close stop'd by the same Pipe that carries the Air into it, and the Tongue hinders it from getting up again.

The Force of this Air, which continually pushes in pressing strongly the Bellows, presses equally the Superficies of the Wine over the whole Length of the Piece, without causing the least Agitation in the Wine; and the Force causes it to pass down in the Pipe of Leather,

and from thence into the other Cask that is to be fill'd, where it rises, because the Air is driven towards the Bung-hole, which is open.

The Bellows push all the Wine in the Cask to about ten or twelve Pints, or thereabouts; which is known when they perceive the Wine to hiss in the Syphon; at which time they take from the two Casks the two Pipes that have been forc'd into them, and which are join'd together by the Leather Pipe, and nimbly stop up the Hole at the Bottom of the Piece with a Bung of Oak made round, a little sloping, and drive it with a Mallet: From the other Cask that has been emptied, they pull out the Cannon or Pipe of Wood from the Fountain of Metal, and leave it to drain gently some Pints of clear Wine into a Vessel that receives it.

They observe attentively, every Moment in a clear Glass, if the Wine be neat; and when they perceive but the least thing, without waiting till it appears foul, they stop the Fountain, and take it away immediately, and turn out into a Bucket that little Wine that remains in the Piece: That clear Wine which has drain'd out of the Fountain, they put into the Cask that they have been filling: They use for this Purpose a Funnel of Tin, the Tail of which is above a Foot long, to the End that the Wine that passes through it, may not cause any Agitation in that of the Piece; and that there may not any Filth pass into the Wine, there is, towards the Bottom of the Funnel, a Tin Plate pierc'd through with small Holes, which prevents any thing gross from passing through into the Piece.

They put together into a separate Cask all the Remainders of the empty Pieces; presently after they have emptied one, which they do in less than half an Hour, they wash it with a Bucket of Water, let it stand to drain some Moments and they fill it with another that is to be drawn off.

After the Wine has emptied out of one Vessel into another the first time, they draw it off a second time, at the time we have before mention'd: Sometimes they are oblig'd to do it a third time, to give it a lively Colour, if it has it not already; but four Days before they change the Cask, they give it a *Frizure*, as they call it, and put in it one third-part of ordinary Isinglass.

The most experienc'd Persons shift their fine Wines out of one Vessel into another, as often as they change its Place, as well when they carry it down into the Vault, as up into the Cellar, according to the different Seasons: I have known when, in four Years time, they have drawn it off twelve or thirteen times; and they pretend, that this is that which preserves and sustains the Wine, and that it has been the finer and more delicate.

Their Opinion is, That the Wine is continually forming a fine Lee, which gives it the Colour; and that to preserve it of a good White, it must be often shifted out of one Vessel into another, if it be not put into Bottles; and that there is no reason to fear

that the Wine will be weaken'd by this means, because the oftner it is remov'd, the oftner you give it a new Vigour; and the oftner it is drawn off, the more lively and brilliant is the Colour.

And although I have said, they should not brimstone their Casks, they do not fail to use a Match of Brimstone the first time that they change the Vessels; they mingle a Piece of thick Linen Cloth in the melted Brimstone, and they cut off a Bit for each Cask of fine Wine about the Bigness of one's little Finger, and one as big again for every Piece of common Wine; they light it, and put it under the Bung of the Piece that they empty, before they have Recourse to the Bellows; according as the Wine descends, it draws along with it a small Scent of the Brimstone, which is not very strong, so as to make it perceivable, and that only leaves what will give it a Liveliness of Colour: The same may be done the second time, when they change the Cask, if it has not taken the Scent the first time, otherwise it ought to be drawn off the second time without a Match, to cause it to lose the Scent of the Brimstone, which it ought never to have.

The Wines that are thus clear and fine, keep well in the Cask for two or three Years, and hold their Goodness in the Vaults and Cellars, but especially the Mountain Wines that have a good Body: those of the *River* lose their Quality in Wood, and they ought to be drank in the first or second Year, or else they must be put into Bottles. This Wine will keep very well four, five or six Years in Glass Bottles.

The Use of round Bottles is very common in *Champaign*: They having plenty of Wood in the Province, have there set up very Good Glass-Houses, which they seldom make Use of but in making these Bottles, which are about six Inches high, and four or five in the Neck. These Bottles contain ordinarily a *Paris Pint*, or half a Glass less. They sell them commonly for twelve or fifteen *Francs* a hundred. They have a certain Quantity in every House. Before they enter upon a Piece of Wine to drink, they put it into Bottles, well wash'd and drain'd, in order to have the Wine of one Piece equally good.

When they have a Mind to draw off a Piece of Wine into Bottles, they put a little Syphon of Metal into the Cask, which is bent downwards to strain it into the Bottle, under which there is a Tub or Bucket to catch the Wine that shall run over. They stop up every Bottle carefully with a good well-chosen Cork that is not Worm-eaten, but that is solid and close. These Sorts of fine Corks cost fifty or sixty *Sols* an hundred. There cannot be too much Care taking in the chusing Corks, lest the Wine spoil in some of the Bottles, when the Corks are defective; therefore great Care should be taken in the chusing them, when you would draw off fine Wines into Bottles, whether it be for keeping, or to be sent abroad.

When

When Bottles are us'd that have been made Use of before, they should be wash'd with Leaden-shot and a little Water to fetch off the Filth that shall remain on the Bottom of the Bottles; but it is much better, in the room of them, to use small Nails, because they perfectly take off all that which sticks to the Glafs.

When all the Bottles, that suffice to empty one Cask, are fill'd, they tie the Mouth of the Bottle over to the Neck with a strong Pack-thread; and if it be a fine Wine, they commonly seal it with *Spanish Wax*, that the Wine may not be chang'd, nor the Bottles, by the Domesticks; and some Persons have their Coats of Arms made on the Bottles, which does not enhance the Price above thirty *Sols per Cent*.

When all the Bottles are well stopp'd, ty'd down, and seal'd, they ought to be set either in a Vault or Cellar, upon Sand two or three Fingers Depth, and laid Sideways, leaning against one another; when they are set upright, they form a white Flower upon the Wine at the Top, in the small empty Space that is between the Top of the Mouth of the Bottle and the Wine; for the Bottles ought never to be fill'd up to the Top, but there must be left a small empty Space of about half an Inch between the Wine and the End of the Cork.

If this was not done, the Wine would set a working in the different Seasons of the Year, and break a great number of Bottles; and it does, notwithstanding, break a great many, in spite of all the Caution that can be taken; and more especially, when the Wine has a great deal of Heat, or is a little tart.

In some Years the Wine grows ropy in the Bottles, even in the Vaults, so as to rope when it is pour'd out, as if it had Oil, so that it cannot be drank. This is a Malady that seizes the Wine that has stood several Months without being remov'd from one Place to another: If it be set in the Air, it will lose more of its Ropiness than it will if left in the Vault: It will recover itself in eight Days, if set in a very airy Granary, better than it will oftentimes do in six Months in a Vault.

When one is oblig'd to drink a ropy Wine, if he shake the Bottle strongly for the Space of half a Quarter of an Hour, and then uncork it immediately after he has done shaking it, the Bottle being inclin'd a little on the Side, will cast out presently half a Glafs of Froth or Scum, and the rest of the Wine will be drinkable, whereas otherwise it would not be so.

For about twenty Years last past, the Gust of the *French* has been determin'd for a frothy Wine, and this they used to love, as one may say, even to Distraction. They have Legun a little to come off from that for the three last Years. Their Sentiments are much divided as to the Opinion of this kind of Wine: Some believe that it proceeds from the Force of the Drugs that they put in it, which makes it froth so strongly: The others attribute to the Tartness of the Wines, because the greatest part that do froth are extremely tart: Others

attribute this Effect to the Moon, according to the times in which these Wines are bottled.

It is true, there are a great many Wine Merchants, who seeing the great Fondness that their is for their frothy Wines, oftentimes put in Alom, Spirit of Wine, and Pigeons Dung, and a great many other Drugs to make it froth extremely; but it is certain, by Experience, that the Wine froths when it is any time bottled from the Vintage to the Month of *May*: There are some who pretend, that the nearer the Vintage-time the Wine is produc'd, when it is bottled, the more it froths. Many do not agree to this Opinion; but nothing is more certain, than that there is no time in which the Wine froths more, than about the End of the second Quarter of the Month of *March*, and this always happens towards the *Holy Week*. There does not need any Artifice at all, one may always be sure to have Wine perfectly frothy, when it is bottled from the tenth to the fourteenth of the Month of *March*; of this there is such reiterated Experience, that it cannot be doubted.

It is good to know, that the Wine does not froth presently after it is put in Bottles. It must be at least six Weeks, and sometimes six Months before it froths well. If it is to be transported, you must give it near a Month of the Vault, especially in the *Summer*, to recover its Remove.

But as Wines (especially the Mountain Wines) are not ordinarily bottled in the *Holy Week*, because they are then too green, or have too much Hardness, especially if the Year has been cold and moist, or too much Liquor express'd, if the Year has been hot; the most sure and advantageous Way to have exquisite Wine, that is perfectly frothy, is not to bottle it 'till the Rise of the Sap of *August*. It is certain by Experience, that it froths excessively when it is bottled from the tenth to the fourteenth of *August*; and as it then lost either the Tartness or Greenness of its Liquor, one may be assured in either Bottles to have the ripest and most frothy Wine.

There has been another Experiment try'd, which is, not to bottle the Mountain Wine 'till the *Holy Week* of the second Year, that is, eighteen Months after the Vintage; and it has been found, that it froths sufficiently, but less by half than that which has been bottled in the Rising of the Sap of *March* the Year before.

It is not believ'd that the River Wine, which has a less Body than that of the Mountains, can froth so much in the second Year.

When one would have Wine that will not froth at all, it should be bottled in *October* or *November*, the Year after the Vintage: If it be bottled in *June* or *July*, it will froth slightly; though but a little, if any thing at all.

To find in the Wine of *Champaign* all the Merit that it ought to have, it should be taken out of the Vault not above half a Quarter of an Hour before it is drank, and it must be put

put into a Bucket, with two or three Pounds of Ice; the Cork should be opened, and put in again lightly; which, if it be not done, the Wine will break the Bottle, or will not grow cool if it were not unstopped, and it would evaporate itself, if it remain'd quite open. When the Bottle has been half a Quarter of an Hour in this Ice, it must be taken out, because the Ice would otherwise chill it too much, and make it lose its Briskness. This Wine will be excellently good, and of a delicious Flavour, when it has been a little affected by the Ice, but great Care must be used, that it may not be either too much or too little.

As these Wines, especially those of the same Year, work continually in the Vaults and Cellars, and still more in Bottles than in the Pieces, according to the different Seasons, and the divers Impressions of the Air, it ought not to be surprising, if the same Wine, especially the new, oftentimes appears different in Taste. We find a Wine potable in *January* and *February*, which will seem hard in *March* and *April*, because of the rising of the Sap, which agitates it more; the same Wine in *June* and *July* will appear entirely soft, and in *August* and *September* we shall find it hard again, which one shall not be able to perceive any thing of during the preceding Months, because the rising of the Sap of *August* will put the Parts in a great Motion. This Effect Motion will have on the River Wines of the Year; but oftentimes the Wines of two Years from the Mountains will appear more mellow, more or less exquisite, more or less forward, according to the different Motions it has received by the different Impressions of the Air, which will vary more sensibly in the different Seasons of the Year.

There ought to be a very great Attention to keep the Wine continually in cool Places; nothing does it more Hurt than Heat: It is therefore of the greatest Importance to have good Cellars and excellent Vaults. No Part of the World has so good Vaults as those in *Champaign*, which is the Reason it is so difficult to find any where else so good Wines as those of this Province.

Those who would lay up a Stock of Wine, and are able to keep it two or three Years, or whose Business it is to send it into other far distant Provinces, or to foreign Countries, ought to chuse the Mountain Wine; for as it has more Body, it will better bear Transportation than those of the River; and besides, the *English*, the *Flemings*, the *Dutch*, the *Danes*, and the *Swedes* desire these strong Wines, that can bear the Transportation, and hold good for two or three Years, which the River Wines will not do.

The most noble River Wines are those of *Anvillers*, *Ay*, *Epernay*, *Pierry*, *Cumieres*: Those of the Mountain are, of *Sillery*, *Verzenay*, *Taissy*, *Milly*; and above all, those of *St. Thierry* have the most Reputation. The last has for a long time had the greatest Name, and been the most call'd for, and one may venture to say, that it comes nothing behind the best Wines of *Champaign*.

By all the Observations which have been made on what is practis'd in this Province, in cultivating and ordering the Vines, and in fining off the Wines, in bottling and carrying them up and down into Cellars and Vaults, and from Vaults to Cellars, it will be found that even Persons of good Taste, in the Provinces of *Burgundy*, *Berry*, *Languedoc* and *Provence*, who are yet very curious and delicate in making Wines, especially for their own Tables, know not so well how to bring it to Perfection as those who are accusom'd to make it in this Province; for though their Wines have not the Tartness of those of *Champaign*, yet they are able to make them more clear, fine, and light. They might therefore try if they would not be preserv'd better in drawing them off from their Lee, than in letting them lie on it, according to their usual Custom, which some are of Opinion is absolutely wrong. They should chuse and pick, in the Fresh of the Morning, their finest black Grapes, and those whose Berries adhere the least together, because they are the ripest; and they should observe to leave as little Stalk to them as may be; and with regard to Pressing, which they are usually faulty in, they should immediately, as soon as carry'd, trample every Load of Grapes successively as they are brought in; and collecting the first, must put it in new Casks of a less Size: and when they have finish'd treading the Remainder of each Carriage, they should put them into the common Vats; but let them not remain there so many days as they are generally us'd to do, that so their common Wines may be thinner, and less strong. By this Management, they might make four, five, or six Pieces of fine Wine, more or less, according as they shall find it good; and then they should take the same Care as has been said those of *Champaign* do: and if they would be content now with a less Produce, they would have a far greater Quantity the following Years, and would be continually bringing it to a still greater Perfection, as they improved more and more in Experience. In those Countries were they can conveniently have Presses, they should make them.

Their Wines should be more delicate, more light, and less colour'd by this Attention, and with half the Fining, would be better for Transportation, in drawing them from the Lee, and especially if they are put into Bottles.

There are some Districts or Cantons in the South Provinces of the Kingdom, where the Earth is very fine, which would produce exquisite Wine: It would not, indeed, have the Tartness as those of *Champaign* have, but then it would have another very pleasing Flavour that those have not.

All these Observations which we have made will be of great Use to those Persons who would improve their Wines, or desire to drink delicious Liquor. But such Persons must remember, that they ought above all this to study to have good Vaults; and those which are coolest in the Summer, and warmest in the Winter, are ever the best.

It may seem to many Persons in this Country, that we have been too prolix in the Account we have given; but these Observations are not design'd for those who are acquainted with the Practice already; but for such Persons as are wholly ignorant of these things, and who are so far from taking any Pains in the ordering their Wines, that it is a Pain to them to conceive the greatest Part of those things which I have taken notice of, to be necessary; and who cannot be perswaded but that they observe every thing requisite to the proper Management of Wines as exactly as those of *Champaign* do.

Nothing is so astonishing as the Indifference there is in the remote Provinces, where Wine is so abundant, both in the Culture of the Vineyards and the Choice of the Vines, as also in the Manner of Making and the Management of the Wines. The Want of Presses ought not to be allow'd as a just Excuse for their not making their Wines intirely white. But of this anon.

They practise nothing in *Champaign* which may not be perfectly imitated in other Places; the drawing off the Wines, the Manner of fining them, and putting them in Bottles, &c. is all equally possible, and also easy. Many Persons might enrich themselves, if they would set themselves about it, with the Help of these Observations, and of those they might make themselves to bring their Wines to Perfection; and instead of selling them for one or two *Sols per Pot*, as they ordinarily do, they might sell them for upwards of eight or ten. They would have the Satisfaction of augmenting their Income, and see their Wines sought after, and they would be able to sell them not only at Home, but also to transport them into foreign Countries; because their Situation is more favourable to send them by Sea than that of the *Champaignois*, who are oblig'd to transport theirs upon Waggon and by Rivers, into *Germany*, and the farthest Parts of the *North*.

Perhaps some Criticks will object the Difference of Climates, which will not permit the same Culture of the same Plants, which by their different Qualities do require particular Managements. This Way of Reasoning might have Place, if I had pretended to speak to a People who studied to order their Vines with great Attention, and to give them a Fineness; but I have it chiefly in View, as I have had in collecting these different Observations, to instruct those People who are intirely ignorant of the Method us'd in those Countries where they are accusom'd to make excellent Wines, as well by reason of the Goodness of the Lands, and the Warmth of the Climate, as by the Industry of those who inhabit them.

In *Champaign*, where their Grapes do not ripen but with Difficulty, because their Country is cold, they make the Pale Wines, and the White, the Wines truly Grey, which are a little colour'd, and the Velvet Wines; Why can't they make all these Sorts of Wines in *Berry*, in *Burgundy*, in *Languedoc*, in *Provence*, &c.?

The Warmth of the Climate will not permit Wines to be made perfectly white with black Grapes; they will have a little Colour, and they will not thence be less exquisite than those they have made these fifty Years in *Champaign*, and, in the main, are better in Taste, and better for Health than those Wines that are perfectly white, which cannot be us'd but after Dinner.

The whole of my Intention in publishing this Collection of my Remarks, is to oblige those who desire to be able to give a greater Agreeableness to the Wines that they make for their own drinking, and to animate those who have hitherto thought that a greater Excellence cannot be given to the Wines in their Districts or Cantons, to take more Pains to bring them to Perfection; which will contribute greatly to raise the Value of the Commerce of Wines in the remote Provinces.

A DISSERTATION on the Situation of Burgundy, and the Wines that it produces. By Mr. Arnoux.

The Town of *Beaune* is the Center of *Upper Burgundy*; it is situate in a Territory the most fertile and serene in *France*; it is all round compass'd with Cities, among which is *Autun*, the antient Capital of the *Gauls*; *Dijon*, the Capital of the *Dutchy of Bourgogne*, *Nuis*, *St. Jean de Laune*, *Verdun*, *Seuree* or *Bellegarde*; *Chalon* on the *Saone*, *Arnay le Duc*, *Santien*, *Flavigny* and *Semeur*. *Beaune* is plac'd almost in the Middle of these Towns, which are not above eight, nine, twelve, twenty-one, or twenty-four Miles at the farthest, to be, as it were, a Nurse to them all, in distributing plentifully amongst them the Liquors which it produces.

All the Learned are agreed unanimously, that it is the antient *Bibracte* of which Mention is made in *Cæsar's Commentaries*, in these Terms; *Postridie ejus Diei*, &c.

Cæsar not having above two Days Provision for his Army, and being not above thirteen Miles at the most from *Bibracte*, the biggest, richest, and most fertile City of the *Heduns*, thought proper to march thither to provide Provision for his Troops, and that is the Reason he quitted his Way to *Switzerland*, and came to *Bibracte*, *Com. Cæs. Lib. de Bel. Gal.*

Cæsar says, in another Place, That *Bibracte* among the *Celti* of *Heduns*, is the largest and most fruitful City of the *Gauls*, and that which has the greatest Authority among the *Heduns*; in which he call'd a Council of War, issued Laws, and where he pass'd the Winter with his Troops. He says also, That this Town is situate at the Foot of a Hill, and that it is not far from the Town of *Autun*. All this appears true, as well from the Fertility of the Country as its Situation and its Distance from *Autun*, which is not above twenty-four Miles.

Nevertheless, *Bibracte* having been the Theatre of many Wars, and having been ruined by several Sieges, *Beaune* has been built upon its Ruins, and has taken its Name of

Bellona, because its Inhabitants were always train'd up in Military Discipline; and afterwards in *Latin*, was nam'd *Bellona*; and since that *Belua*.

The several Wars which have ravag'd this Country, have not left any Monuments of this Antiquity so worthy of Remark, as are to be seen in the precious Remains of that Sort in the Town of *Autun*.

And if I might be permitted to make here a small Digression, I would entertain the Reader with the Antiquities which I have view'd during the long Residence which I made there.

The finest Piece of Antiquity that is to be seen there, is an Amphitheatre of a vast Extent, the Traces and Footsteps of which, although worn by Time, are yet remaining in a Semi-circle, and do extend a full third Part of a Mile in Length; there are to be seen the Caverns, where the Lions, Tygers, and other fierce Beasts were shut up: And there are still Parts of the antient Walls remaining, which shew that the Circumference of this Town was six or seven Miles; the Place, which is in the Middle of the Town, is four times as big as the Square of *St. James's*, where the Troops are exercis'd in Arms, and which is call'd the *Field of Mars*: The Tomb of *Divitiacus*, which is of a round Form, comes out of the Ground like a shapeless Lump, and suddenly growing narrower towards the Top, appears as if broken. This Mass, which has neither going in or out, is elevated on a rising Ground, worn out by Time, and appears like a Block; the Sand, the Lime, and the Stones are become all the same by the Rains and the Air which have calcin'd them: This Pyramid has subsisted above two thousand Years.

There remain of this antient City two Gates, which have held out obstinately against Time that consumes all that Mortals would eternize: The one, rais'd upon four massy Piles, incircled with bass Reliefs and Hieroglyphicks, forms three Centers crown'd in one Range of Architecture of fluted Stones, which are all of an extraordinary Height, in which no Joints nor Cement can be perceiv'd. There also yet appears one half Part of the Temple of *Janus*, the Mount and the Forest of the *Druids*, the Mount *Jovis* or *Jupiter's* Mount; and in digging the Earth but never so little, or in ploughing, there are found Urns and Medals.

But to return to the Town of *Beaune*. This Town cannot pretend to glory in these antient Remains of Antiquity, which the Air consumes, and Time reduces to Dust; it only glories in its good Wines, which every Year brings to the Citizens new Riches: However, it has been within an Age past a strong Place, and is still surrounded with a large Ditch which runs into the River *Burgoise*; this takes its Source at about half a Mile from one of its Hills. It is also encompass'd with a Rampart, flank'd with some Towers, and five great Bastions; the Ditch, which encompasses the Town, is above a Mile and an half in Circumference: The Citizens there enjoy almost

continually a pure Air and a clear Sky, being equally about an hundred Leagues off from the *Mediterranean* and the *Ocean*. The Waters are, as one may say, in suspense, when it is about to determine its Course: There is also a great Body of Water in its Neighbourhood, which is seen in all the Charts of *France*, under the Name of the *Pond of Long Extent*. It is the Opinion of some Persons, that this partakes of the Waters of both Seas.

This Town can count fourteen or fifteen thousand Inhabitants, of which the fourth Part are employ'd in cultivating the Vineyards; another fourth Part in carelessly exercising some Professions that they are ignorant of; and the other half in enjoying the Pleasures of a soft, idle, and delicious Life. The Gout and Sicknesses are banish'd from these Walls. From these Hills, that produce such exquisite Wines, issue out Fountains of Ice, and little Rivers as clear as melted Crystal. These Waters issue out from the Earth in a Line opposite to the Perpendicular, bubbling up, and pushing out of the Earth on high Globes of Rock-Crystal, which keep their spherical Figure till they are at the Superficies.

The Purity and Lightness of these Waters are the Cause that they here eat the lightest and best Bread in *France*. The Cattel are not so large nor fat as those of *England*, but they have a more delicious Taste. The Game there is most delicious; but above all, those who inhabit the Hill, where grow *Thyme* and *Maryjoram*, and in some Places *Broom*: And in the Month of *September*, a little Bird, bigger than a Linner, and smaller than a Lark, comes to furnish the Inhabitants of these Hills with the most dainty Dish which can come to a King's Table: This is the *Wheatear*, which comes out of the Wood, when the Grapes are ripe; they get among the Vineyards, and fatten themselves with the Grapes, which they pick with their sharp-pointed Bills, from which they suck the Juice, and with which they make themselves downright drunk. This Bird comes into the Vineyards small and lean, and in a little time grows fat to the very Extremity of its Wings, to that Degree, that they cannot fly above eight or ten Paces, by reason of the Weight of that Bulk which they have acquir'd upon the Vine-Branches: So that in order to render them light to fly, they ought to take the Counsel of *Horace*, which he makes the Weasel give the lean Fox that had entred through a strait Hole into a Barn of Corn;

Macra carum reptes arctum quem macra subisti.

It is pretended, and I do believe, that this little Bird is the most delicious Dish in *Europe*; I have seen a great many in *England*, and have also kill'd them out of Curiosity; but as they have not the same Liquor and the same Feed that they have in *Burgundy*, they have nothing of the same Taste.

Beaune is remarkable for the Magnificence of its Hospital, which was there founded and

and built by Chancellor Rolia. Philip the Good Duke of Burgundy, being inform'd that his chief Minister had attempted so great a Work of Piety and Charity, laugh'd, and said, Since his Chancellor had done so much for the Poor in his Life-time, it was but just that he should lodge them, and feed them after his Death.

The Hills of Upper Burgundy which produce the Wine, the only Wine which one can or ought to call Burgundy Wine, do not extend farther than from Dijon to Chalon upon the Saône; yet we ought not to reckon these Vineyards to be in Perfection but from Chambertin to Chagny, about twenty-four Miles in Extent: For the Vines at Dijon and Chalon do not enjoy those Climates which produce those Wines that are fit to be transported into Great-Britain, the Circles of the Empire and the Low Countries, as those which are confin'd within the Limits, that I shall mention as exactly as I can, without being apprehensive of passing under any Censure upon this Account.

The same Row of Hills in the same Situation, and having the same Aspect of the Sun, extends itself almost as far as Lyons, and all those little Mountains are wholly cover'd with Vines; but the Lands are less fine, and less light at Chalon; are heavier at Tornus, and coarser at Macon: This alters the Form of the Productions of these little Hillocks, which notwithstanding they have the same Arrangement and the same Situation, produce so different Liquors.

All those little Vallies are link'd one to the other to the East Aspect of the Sun, and form the Figure of an unbent Bow, and have opposite to them a Row of Mountains of the like Figure, but a great deal higher, which appear or seem to join them, although they may be fifteen, twenty, thirty, and some sixty Leagues off, and forming an oval Figure, contribute to make the finest Prospect in the World. This Oval must have more than one hundred and fifty Leagues in Circumference.

From these Hills of Beaune all the opposite Mountains are seen, and they are those of Switzerland, the Franche Comte, and Mount Jura, of which Caesar speaks, at this time call'd Mount St. Claude, those of Savoy: Beyond these is a frightful Void, and of an immense Length, and Mount St. Bernard rises into the Clouds, always cover'd with Snow in the most violent Heats of the Dog-days; and although it be sixty-five Leagues off from Beaune, it is seen distinctly without the Help of any Glass which shall bring it nearer to the Spectator's Eye.

This perfect Oval forms a Plain of the same Figure, to which these Mountains that environ it, seem to serve for Walls and Ramparts: This vast Plain is water'd by the Saône, which Caesar calls Arar; and by the Doux, which he calls *Alduafidubis* in his Commentaries, which has its Source at the Foot of Mount Jura, passes by Besançon and by Dole, and casts itself into the Saône at Verdun: There are also a thousand petty Rivers and Streams, which, after many Turnings and Windings, lose themselves in the Saône.

This great Plain, which is as the Center of the Continent, is so even, that the Saône which runs through it, by its gentle Course, deceives the Eyes of those who look upon it, it being difficult to discover which Way its Stream glides; Caesar himself was surpriz'd at it, as he declares in Lib. I. of his Commentaries.

The Saône is a River that separates the *Heduvani* and *Sequani* (i. e. *Bourgeois* from the *Franche Comte*) and flows into the *Rhone* with an incredible Gentleness, that one cannot distinguish by the Eye which Way its Waters run.

This is a vast Plain, so fertile and even, that all the Kings of France are wont to assemble their Armies there, when they have a Mind to shew the Encampment of all their Troops to the Queens and the Ladies of the Court.

Behind the first Row of Hills that produce so good Wines, there is nothing to be found but Hills and Vallies: The Hills that are the least distant, are all planted with Vineyards, and these Situations are call'd *Backward Hills*: In the hottest Years, when the Rains are less frequent, the Grapes there make a very good Wine, but it never has the Perfume of the Wines produc'd by the forward Hills.

The Plain of this Oval is in part cover'd with Wines, fertile in all Sorts of Grain, embellish'd with vast Meadows, where a thousand Streams play in their different Windings, adorn'd with fine Forests inhabited with Stags, Wild Boars, and, above all, with Roe-bucks, which are there very delicious, and agreeably furnish the Gentry with the Divertisements of Hunting.

A great Part of these Lands are planted with Trees in Form of Orchards, which produce without Culture excellent Fruit, which when they have been once grafted, it is enough, the Sun and the Earth do the rest: The *Peach-Trees*, which throughout sympathize with the *Vine*, do there make upon the Banks a fair Forest; and the Branches of these Trees grows thinly, and the Leaves being narrow, they don't hinder the Sun from darting his Rays on the *Grapes* to ripen them: The *Peaches* which they produce are of a Figure and a Colour that would not anticipate one in their Favour; nevertheless, when one has tasted of them, it seems to the Palate to be a Fruit made of Wine and Sugar.

It ought not to be forgotten, that when the Sun is risen above the Mountains of Savoy, there is a Prospect of the Hills of Burgundy, where it shines during the whole Day; and in setting behind the Hills of Beaune, darts its Rays upon the Mountains of the *French Comte*, which lie opposite to it, and there, in going down, ripens very excellent Wines, as those of *Arbois*, which are so well known throughout Europe for their excellent Qualities.

Before I begin to speak of the Quality of the Wines of Beaune, it will be proper to give an Account of the Manner in which they there cultivate their Vineyards, and make their Wines: For altho' Burgundy, by the Good-

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ness of its Soil, and its Exposure to the Rising-Sun, does naturally produce delicious Grapes, yet the Manner of cultivating their *Vines*, and of making their Wine, contribute much to its Goodness.

During the Winter, the *Vignerons* employ themselves in examining the Earth of their Vineyards; and by some Loads of Earth conveniently laid, which they carry thither, they fatten the Places which appear to be worn out, and seem to require Assistance to produce the better Grapes, which happens, however, but very seldom. Then they take Notice of those Places which are void of *Vines*, whether they are declining by Age, or do not appear to promise Grapes; and they make large Trenches from a Foot and a half to two Feet and a half long, and a Foot deep: If the Earth is too lean, they put in half a Foot of good Earth, and sometimes a little old well-rotted Dung, but, generally speaking, they put in nothing at all; and taking one or two Branches, they bend them down into each Trench, and cover them afterwards intirely with the proper Earth of the Vineyard, in such manner that you may see the two Ends of the *Vine-branch* bent come out of the Earth; to wit, that by which it holds by the *Vine*, and that of the other End which comes out of the Trench where they have bent it, about three or four Fingers Lengths. They make a great many of these Trenches in a Vineyard, that they may be always supplied with young *Vines* that will produce a good Plenty of Grapes: For it ought to be observed, that this *Vine-Branch* bent down in a Semi-circle in this Trench, which is a Shoot of the preceding Year, having its Pores open, takes in two Sorts of Nourishment; the one from the *Vine* to which it is united, and the other from the Trench in which it has been bent, in which it takes Root. These are what they call *Provins* or *Layers*.

They produce abundance of Grapes, which are commonly first ripe, well nourished, large and well relish'd, but their Juice is not so good as that of the Grapes of the old *Vine*: The Physical Reason is, that the nourishing Juice has not been so well filter'd in passing through those Layers, whose Pores are very open, as in passing through the Pores of the old *Vine*, whose Pores are more close and less spungy.

They dig with a Spade the Vineyard ordinarily three times a Year, that is, about the End of *February* or Beginning of *March*, when they give it the first time; and it is in this Month of *March* or about the End of *February* that they prune their Vineyards.

And in this consists the Address and Skill of the *Vignerons*, for he ought to make a right Choice of those fine Branches that he is to prune, and of the Joint where he is to cut the Shoot, as well as that which he is to cut intirely off.

See here what I have seen practis'd by the *Vignerons*. Of four or five Sprigs, the Shoots of a Year, belonging to the same Stock or *Vine*, they leave but one or two of the best

made, which they cut off to the third or fourth Joint at most.

The same they practise on the *Vines* on the Hills, which produce the finest Wines; for as to the *Vines* on the Back-side, or of the Plain, they cut them to the second or the first Knot, for these *Vines* put forth too many Twigs: But as this is an Art of which it will be difficult to give the Precepts, because the manner of cutting the *Vines* is different, according to the Ground, the Nature of the *Vine*, its Quality, Exposition, and Nearness to the Sun, I will go on with my Dissertation.

When the *Vine* is cut, they place *Vine Props*, to which, to the Height of half a Foot above the Earth, they bind the Branches of the *Vines* in a horizontal Manner; and afterwards, when the Buds or Eyes are open'd, and have put forth Shoots in Length about a Foot and a half, they embrace them, that is to say, they bind them to the Props which sustain the *Vines* which produce them. These Props are of the Height of three or four Feet, and the Thickness of an Inch, are stuck into the Ground without any Arrangement or Order, at the Distance of a Foot more or less the one from the other, according as the Vineyard is more or less furnish'd with *Vines*.

Nevertheless the End of the Shoots which are there bound horizontally, as one may say, look all to the same Side.

This Manner of placing the Props without Order, is of great Consequence, that is, that one Branch may not be covered by the Shadow of another but as little time as may be; and that if the Rot comes to some Grapes, they may not be able to communicate it to others. This Manner is contrary to that of the *English*, who plant their *Vines* in Hedges; and thence it is that the one hinders the Sun from shining upon the other, and of consequence that hinders the Ripening of the Grapes.

That is the most dangerous Season for the *Vine*, and the most delicate, when there has been a North Wind, and that has caus'd a small white Frost: If the Sun comes to appear in the Morning, it dries and burns all the young Leaves, the Buds and the Grapes, after the same manner as if Fire had been there.

It is for this Reason that the Friars in *Burgundy* have Recourse to Prayers at this Time more than at any other; and that after there has been calm and cold Nights, the superstitious Peasants run to the Churches, and ring the Bells with all their Might. Whether it be that they imagine that God has any Regard to this Work of Religion, or that the Agitation that they make in the Air, may, in some sort, warm the Air again, or change the Wind: But however it be, they do at this Time ring the Bells with such Violence that there is no sleeping: During which Time, the Priests and Monks are busy in reading in the Churches the Passion of our Saviour, according to the Gospel of St. *John*; and for this Occupation, they make a Collection among all the Presses at the Time when they make their Wine, and every *Vignerons* is oblig'd to give them a certain

Quantity

Quantity of Wine, and that by an Order of Parliament at *Dijon*.

When the Vineyard has escap'd the Danger of the Frost, they dig afresh; and this they call [*biner*] the digging of the Vineyard the second time; after which the Grapes soon begin to flower, which spread a sweet Savour all over the Country; and is the Time when all the Wines which are in the Tuns in the Vaults, though never so deep, if they are upon their Lee, without having been drawn off or clarify'd, work, ferment, grow thick, and cover their Superficies with small white Flowers like Snow; a Thing difficult to be explain'd by Philosophers, in this Question, in Physicks, when they demand *Utrum detur actio in distans*.

It must be observ'd, that all the *Vines* of the good Hills of *Burgundy*, pass from their Flowers to the Grape; that is to say, that the Flower of the Grapes change into Berries in the Space of twenty-four Hours; and if during that Time, there happens a cold Fog, or a cold Rain, their Flowers, instead of turning to Grape, fall, and the second Peril is no less dangerous than the first, when that happens: The Term that they make use of to express it, is, to say the *Vines* are [*coulé*], i. e. drop their Grapes.

At the End of *June* or Beginning of *July*, is the Time when the *Vine* changes from the Flower to Berries; after which, the *Vine* has nothing to fear but the Hail, or a too great Drought. As soon as ever the *Vignerons* see the least Cloud to rise upon the Horizon, and the Air seems to threaten the least Storm, they have Recourse to their Priests and their Bells, and their *Pater-nosters*, which they would not recite but for Fear that the People would rise against them if Hail should happen during that time that they were not at their Prayers.

The Reason that they are so much afraid of the Hail in *Burgundy* is, because the Vintage is all the Dependence of the Inhabitants; and that the Grapes being smitten by this Scourge, give to the Wine, in some measure, the same Taste and the same Scent which Lightning spreads on the Places where it falls, a Scent which is impossible to take away.

As to Drought, it is not only to the Bells, or to the Priests that they have Recourse, but to one or two Stone-Busts in two Villages about seven or eight Miles from the Town of *Beaune*; one of which Idols is known, and worshipp'd under the Name of *St. Revereen*, and the other under the Name of *St. Marguerite*: They assemble together, and go in Procession to search in Triumph for this Stone, which they carry solemnly to a Church in the Town. All the Priests go in Procession, follow'd by the Parishioners of which they are Curates, and they offer their Incense and their Prayers, rub their Books and their Chaplets against these extraordinary Figures; and oftentimes it happens to rain in this Conjunction, which does not a little contribute to keep up this Superstition in the People.

It is in *July* that they dig the Vineyard the third time; this they call *Tbirding*. There

are many Years in which they dig their Vineyards the fourth time, and this is in the Month of *August* that they give it this fourth Digging; but they take great Care to dig the fourth time when the Season is not too hot or dry; or on the contrary, to defend the Grapes from the Heat of the Sun, they let the Grass grow in the Vineyards; this shades them, and hinders the Vapours of the Earth from burning the Grape.

A Month before the Vintage, the Magistrates of *Beaune*, accompanied with many experienc'd Judges and Persons of Probity, make three Visits to examine the Maturity of the Grapes; and at this third Visit and Examination, they decide the Day of gathering the Vintage. No private Person dares to cut in his own Vineyard one single Basket of Grapes upon Pain of Confiscation and a considerable Fine; for if it were permitted to each particular Person to gather his Vintage according to his own Fancy, and his particular Opinion, and according to his Taste, there would be Wines too green sent abroad into other Countries, to the Dishonour of *Burgundy*, and to the Discredit of the Wines.

And also for Fear that any Vapour should spread itself over the Vineyards, for fifteen Days before the Vintage, they take Care not to burn any Straw or Hemp-stalks in the Streets, lest the Smoak should give any bad Taste to the Grapes.

The Grapes being come to Maturity, the Magistrates give Notice a few Days before by a Trumpet to the Town, of the Time they have appointed and fix'd for gathering the Vintage. *Volnet* begins first, a Day before *Pomard*, and afterwards all the little Hills gather their Vintage indifferently; for after the Town of *Beaune* has gather'd their Vintage one single Day, the Vintage is open'd for all the other Vineyards on the Side of *Burgundy*. It will be seen by-and-by why *Beaune* decides the Vintage of *Volnet* and *Pomard*. It will scarce be believ'd, that all the Hills from *Chambery* to *Chagny* should have their Vintage gather'd in the Space of four or five Days; and also it is scarce credible, what a vast Number of *Mountaineers* from every Part come to labour in this Work.

They gather the Vintage, perhaps, (and my Conjecture is founded upon more than twenty-five Vintages, which I have seen made) more than two thousand [*Queues*] Tails of Wine upon these Hills; and the *Queues*, which is always divided into two Punchions, sometimes into four Feuilletes, and very rarely into eight Cabillons, contains five hundred Bottles of Wine, or, to speak more exactly, four hundred and forty Pints *Paris* Measure.

It will be proper here to observe, that in this great Extent, the Vineyards produce but one kind of Grapes, which they call *Noirons*; the Berries of which are black when they are ripe, and quite round: The Plain and the Backsides produce only a sort of Grape, of which the Berries are bigger and a little longer, which they call *Gamet*.

Those who would make excellent Wines, never cut the Grapes till after the Sun has dry'd up the Dew which has fallen in the Night-time; for this Moistness, although it be but a rarefy'd Air, cools the Grapes, which being cast into the first Vat, suspends, and oftentimes hinders the Fermentation. Those covetous Persons that are more desirous of the Quantity than the Quality, use not these Precautions; but on the other hand, those who would make excellent Wines, do not put into the same Vat any Grapes but those of the same *Vine*; but almost all the particular Persons who have an hundred Perches of Vineyard in different Cantons, mingle their Grapes the one with the other, because the strong helps the weak, and the good mends that which is worse; and, in a Word, that they may make the Vat the larger. The Choice of the Cantons from whence the Wine is produc'd, depends on the Discernment that the Courtiers or Commissioners ought to have, when they taste the Wines that they would send into other Countries, and that which the *English* Gentlemen ought to recommend to their Commissioners who furnish them with Wine for their drinking.

The Grapes being put into the fermenting Vat, throw up a great Scum, which, by the Agitation, make to the Ears a continual trembling, a little clattering, and spread abroad such a Scent that is capable of intoxicating, and perfumes the Houses, and spreads itself all over the Town.

They do not let the Grapes lie still in the Vat; they stir them and disturb them: The Labourers trample them briskly three different times, for the Space of two Hours each time. And to give a clear Idea of the Manner of treating the Grapes in the Vat; as soon as they begin to ferment in the Vat, they tread them for two Hours at the least; six Hours after they tread them again for as long time as before; and six Hours after that they tread them the third time; and after that they put them under the Press.

It must be observ'd, that the Grapes of *Volnet*, of *Pomard* and *Beaune*, being fermented in the Vat in the Field, cannot be let stand above twelve or eighteen Hours there; those of *Pomard* a little less; those of *Beaune* so long, or a little longer, according to the Delicateness of the Ground, and the Heat of the Grapes: For there are Vineyards behind the Hills of *Beaune*, the Grapes of which don't begin to ferment till after they have been eight or ten Days in the Vat. *Note further*, That to give a Colour to the Wine, this depends on the Time more or less that it is left in the Vat. As for Example, The Wines of *Volnet* have the Colour of a Partridge's Eye. This is the Cause they do not leave the Grapes of this Ground but a very little time in the Vat; and if they should let them be there but a little longer than they ought, the Wine would lose its Delicacy, and would taste of the Grape-stone or the Stalks.

After the Grapes have been, according to their Quality, more or less time in the Vat,

and have been trodden, there swims over a Liquor that they call *Surmôn*. They have Casks of six-score Pots, or half Hogsheds of sixty Pots ranged upon Chantiers, or Stillings for Hogsheds, into which, by equal Portions, they cast in this first Running; and afterwards they put the Grapes that remain on the Press, when the *Surmôn* has been drawn off: And when these have been well press'd, all the Liquor that comes from them is equally distributed into those Pieces where they have already put the unpress'd Wine: And then they open the Press, and afterwards with a Planer they cut the pressed Marc three or four Fingers thickness round about, and put the Parings in the Middle, and afterwards press it again; then they cut it again, and press it the third time; and all the Liquors of these different Pressings are equally distributed into the Tuns till they are full.

Upon which it ought to be observ'd, that the unpress'd Wine is the most light, delicate, and least colour'd Liquor; that which comes of the first Cut of the Press the most racy; and that which comes from the second and third Cut of the Press is more hard, red, and green; so that these three Sorts of Qualities, being united, make a Wine much better, more durable, and better colour'd.

All these Pieces or Tuns being full, they leave the Bung open, and the Wine in a Fury, shakes and agitates itself in such a manner, that it sends all over the Cellar Fumes that will intoxicate, and which are in such Motion, that a lighted Candle being carried thither will be extinguish'd: And if this Wine be put in an Essay, and be shaken a little with the Hand, and you stop the Neck with your Thumb, the Essay will break in a thousand Pieces.

In *Burgundy*, that which they call an Essay, is a little round Bottle, in Length about three or four Inches, and about two in Circumference, which grows less all of a sudden at the Top, in order to form a little Neck open, having a little Rim to receive the Wine and the Cork.

The Wine having cast its Fire and Scum out of the Casks; eight Days after they fill them up again, and stop them up with a *Vine* Leaf, which they spread over the Bung: And lest the Vapours of the Wine should move this Leaf out of its Place, they lay a little Stone upon it to keep it down; because if they should put upon it a Seal or a Bung, the Wine not having Air, would push the Head of the Casks out: Five or six Days after they seal it, and near the Bung they bore a Hole, and stop the Hole which the Gimlet has made in the Tun with a little Bit of round pointed Wood, which they call a Faucet, which they take out from time to time to let the Spirits evaporate; which Precaution prevents the Wine from bursting the Vessel.

This is the Time when at *Beaune* are to be seen the Merchants from all the Corners of *Europe* who come to secure the best Vats for their Kings, Princes and Masters.

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The Commissioners and their Wine Conners prove the Wines although they are not yet drinkable. The Commissioners are the publick Managers, to which all those who would have the Wines of *Burgundy*, address themselves either by Letters or in Person. These are the Judges, which from time out of Mind, from Father to Son, have certain Experience of all the Vats; who know the Climates, Closes and the Cantons from which they are produc'd, and all the good Cellars; to whom it is sufficient to write what Quantity of Wine one would have, and of what District or Canton one would have it of, and provided they have the Purchase-money paid in the Space of the current Year, one may be sure to be well serv'd.

These Managers having receiv'd all the Commissions from private Persons, go to the Citizens, and fill their Essays of the different Vats which they find in good Cellars; and with the Tickets that they tie to the Neck of every little Bottle, or the Name of the Vat, with the Quantity of the Pieces of Wine which they contain, they carry them to their Houses, and let them be unstopp'd; they examine and attend them carefully, and by the different Changes, Taste and Colour, they see the future Colours and Qualities of the Wines that are in the Tuns from which the Essays are taken. They also make yet another Proof with the Wine which is in the Essays: They take Glasses, upon which they put a sinking Paper, which they spread, and which juts out over the Glasses, and press their Finger to make a Concavity; which may contain a fourth Part of a Glas of Wine: The Liquor passes by little and little, and filters through the Paper, and strains Drop by Drop in an imperceptible manner into the Glas which receives it. By the Sight of the Wine which passes through this Paper, they make good Conjectures founded upon a long Experience, concerning the destined Taste, of the Colour, and the Lastingness of the Colour of the Wines they have proved.

The Commissioners having made their Purchases according to the Orders which they have receiv'd from their Correspondents and Merchants, they make Preparations to send them according to their Orders: And as to the Price of the Purchase, they cannot deceive any Person without running great Risques: For if they should make those which send for these Wines pay more for them than they can buy them for in the Cellar, they would expose themselves to Hanging by an Arrêt of the Parliament of *Burgundy*, who have made a Law for the assuring the Fidelity of Commerce of those Wines; which orders, That the Commissioners shall take one *Sol per Livre* for as much as comes to sixty *Livres*; and for what exceeds this Sum, they shall not take more than six *Deniers per Livre*. Thus a private Person who shall receive for six hundred *Livres* of Wine French Money, shall pay three *Livres* to the Commissioner, for what he shall have sent above sixty *Livres*; and for the five hundred and forty which are over and above, for

which he is to pay the Commissioner, he shall not demand more than six *Deniers per Livre*, which will be the Sum of twelve *Livres* six *Sous*; which being added to the three *Livres* six *Sous* above, make the Sum of fifteen *Livres* ten *Sous*; a Sum which would amount to twelve or thirteen Shillings, according to the Exchange: And for this small Profit, the Commissioner is oblig'd to advance his Money to the Citizens of whom he buys the Wines; and that too, when he does not receive his Payment from the Persons to whom they are sent, as it sometimes happens: And the Commissioner that shall be convicted of taking more, whether by Books or other Proofs, will be punish'd, as has been said above.

The Commissioners having purchas'd and prov'd their Wines, according to the Orders they have receiv'd, they cause the Tuns to be new hoop'd, and put Bars surrounded with Pins of Wood of the *Aspen* Tree, and mark them with the Town Mark: And it ought to be observ'd, that no other Country has a Right to imitate or counterfeit their second hooping; and for the greater Surety, they put upon every Cask the Fire-mark, which is a B on the Top, two Inches in Length, with the Cypher of the Year in which the Casks were sent from *Beaune* to go to any other Place.

These are the Precautions that are taken at *Beaune*, by which the Wines that come from thence cannot be mistaken: A Caution otherwise not very necessary, since they manifest themselves so plainly by their Delicacy and their Superiority above all other Wines in the Universe: They are besides very beneficial and proper to establish and to preserve Health; in this surpassing the Wines of *Champaign*, which flatten the Taste, and grate the Palate; but which weaken and extenuate, enervate, and render dull, as one may say, the most healthful Bodies; and which also, according to sad Experience, and the Writings of the Learned, which I have read, breed the Gravel, the Gout, and the Stone.

After having given an Account of the Situation of the Town of *Beaune*, and the Hills which produce the Wines of *Burgundy*; after having related the Manner of cultivating their Vineyards, and of making their Wine; of proving it; of chusing it; of buying it, I shall, next, explain the different Qualities of the Wines which these divers Hills produce: And in order to this, I shall divide what follows into three small Articles. I shall treat first, of the Forward Wines; secondly, of the Wines *de Garde*, or for keeping; and therein I shall treat of White Wines, and shall conclude in giving Instructions for the different Methods that are to be us'd in bringing the Wines of *Burgundy* to *London*, and will advise how the *Beaune* Wine may be sent to *London* in Bottles.

The first Article of the Wines of Primeur, or the Forward Wines.

We call that the Wine of *Primeur*, which will not keep good more than one Year, or that can be kept but a few Months in the second Year.

The first Wine of *Primeur* grows at *Volnet*, which is a Village situated about three Miles from *Beaune*, upon a Descent of a Mile in Height at least, and two Miles in Length on the Side which is expos'd to the Rising Sun: This Village, as well as *Pomard*, have their Dependence on the City of *Beaune*: Since the Citizens have been their Lords, as I have said before, these two Plots of Vineyards, have been oblig'd to receive the Law of their Vintages from the Magistrates and Sages named for this Purpose.

This Hill produces the finest, most lively, and most delicate Wine of *Burgundy*. The Grapes of the Vineyards of *Volnet* are very small as well as the Grain; the Branches rise scarce above three Feet high through the whole Year; the Grapes of it are so delicate, that they won't bear the Vat more than twelve, sixteen, or eighteen Hours; for if they be suffer'd to stand longer, they would take the Taste of the Stalk.

This Wine is in Colour a little deeper than the Eye of a Partridge, it is full of Fire, strong, light, it is almost all Spirit; it is, in short, the most excellent of all *Burgundy*, which by reason of its Violence is not traded in; but its intoxicating Quality is soon dissipated. The Duration of this Wine is from one Vintage to another, tho' it perishes at the Beginning of the *Dog-days*; after which it changes its Colour, and is turned, but yet I doubt not but that it would keep longer in very cold Vaults. The finest of their Vats is drawn from a Canton of Vineyards, that is call'd *Champau*.

Pomard is the second Plot of Vineyards of the *Primeur*: It is situate between *Volnet* and *Beaune*, not quite so high as the first, and a little higher than *Beaune*. It produces a Wine that has a little more Body than the preceding, and it is of the Colour of Fire, and has a great deal of Perfume and Balsam: It will hold good some Months longer than that of *Volnet*: it is more merchantable, and better for Health: If it be kept above a Year, it fattens, ropes, it wastes, and becomes of the Colour of the Skin of an Onion. The best Vat is that of *Commairaine*, that will sometimes keep eighteen Months, but that is according as the Year is.

The City of *Beaune* contains one very considerable Plot of Vineyards; it contains only four Hills, which are about four Miles in Length from *Pomard* to *Savigny*. The first of these Hills is call'd *St. Desire*, the second the *Montée Rouge*, the third *Les Greves*, and the fourth, the *Fountain of Marconney*. These different Soils produce Wines which participate of those of *Volnet* and *Pomard*, without the Faults of them; they have a little more Colour, many good Qualities, and Lastingness.

The Wines of *Beaune* last some more, and some less, but they don't last above two Years; they are sweeter, more agreeable, and more merchantable than the two preceding, and much better for Health. The Colour of these Wines is not equal, because that depends much upon the Manner of making them; or that they let it remain more or less Hours in the

Vat, according as the Climate is more or less delicate where it is made. There are in these four Hills certain inclos'd Cantons, which are in great Reputation. The *Fèves*, the *Cras*, the *Greves*; as also the *King's Inclosures* are very delicious.

Aloffe is the fourth Vineyard of the *Primeur*; it is situated upon the Declivity of a Hill about three Miles from *Beaune*. This Valley is an Ascent so gentle, that one can scarce perceive that one ascends till one has come to the Top of it. This little Village produces Wines of an extreme Delicacy: They are less brisk than the former, but of a Taste more flattering: The Colour is a little more soft, and less sparkling, but fine; and, like the Hill that produces it, the Wine is too little elevated, and too much declining: It partakes neither of the Firmness nor of the Stiffness of the Wines of the Height of the Hills: It has all the Tenderness, nothing of the Hardness, and of consequence is subject, in a little while, to grow ropy, and to take the bad Quality of Sweetness; nevertheless it is sent to foreign Countries, but it requires much Choice and Judgment.

Pernand, which is between the last Vineyard and the grand Vineyard of *Savigny*, is of a greater Extent, but is of small Account, the Wines being not very delicate: They are of the Quality of the precedent Vineyards, but harder and firmer, because they are produc'd upon a Hill that is higher and steeper. There are some Vats very delicious, and these go into other Countries, but under the Name of *Beaune* Wine.

Chassagne is not very considerable for its Extent, but is of greater Reputation for its Wines. This, in my Opinion, would be more fit for *England*, because it would better bear Carriage by Land and Sea. It is extremely strong, full of Fire, and heady. It is commonly tart, which renders it more durable than the others: But if Persons have Skill and Leisure to bottle it in the proper time, and to drink it when its Tartness begins to fall, it is one of the noblest Wines in the World. If I had the Office of providing the King's Wine, I would go into *Burgundy* to chuse it; and in chusing the Wine of this Climate, I should be likely to succeed. This is the only Wine that one may leave in Bottles without Fear of its growing ropy, or changing its Colour, or growing eager, or turning. The longer you keep it, the better it is.

It is more balmy and nourishing, but nevertheless you may not prescribe above three Years for the Bounds of its Duration. It will be fit for drinking at the End of the second Year; sometimes it lasts four Years, when the Vintage has been very good.

This is in the Rank of Wines in the *Primeur*, though its Duration is a great deal longer.

Savigny is a great Extent of Ground between *Beaune* and *Pernand*, situated in a Valley form'd by the Separation of the two Mountains. As the Hills that compose this Vineyard are open to the rising Sun by a great Space; and as they are shut up as they approach to the setting

setting Side, they participate of the Rays of the Sun one Side obliquely, and on the other directly. This Soil produces excellent strong, racy Wines, which have both Body and Delicacy, when they have been drawn out into Bottles; but they must be visited now and then, so as not to let slip the Time when they should be drank. This would be a very good Wine for *England*; it will keep as well, and better than *Chassagne*: It is not so delicate nor so brisk, but it is more oily, and very good for Health.

Auxey is pretty near of the same Situation, in a Corner between two Hills, which open themselves to *Mulsault*, or as far as *St. Romain*, where may be seen high Mountains crowned with very high Rocks. This Vineyard produces Wines more red and stronger than those of *Savigny*, but they have not the Reputation of them. These Wines have more Body than the preceding, and ought to be the Drink of all those Gentlemen that would not shorten their Days by drinking those heady sparkling Wines, an Excess in which is so dangerous.

The second Article, of the Wines de Garde, or those which will keep a great while.

Nuis is a very small Village, about nine Miles from *Beaune*, in the Road to *Dijon*. The Territory of this Village contains between four and five Miles in Extent. All those Gentlemen that love the most delicate and healthful Drinks, have the Wines of the Hills of *Nuis* for their Tables. These Wines are at first very rough, sharp, and tart: They require to be kept till their second, third, fourth and fifth Year; and when their Roughness and their Hardiness is gone, their Tartness being fallen, there comes in their Place a Perfume and Balminess very delicious. They are of a deep Velvet Colour, and yet neat and brilliant. *Lewis* the XIVth drank no other Wine.

The Clove of *Vougeot* is situated a League from *Nuis* on the Side of *Dijon*; it appertains intirely to the Monks of the famous Abby of *Cîteaux*, built between the *Saône* and this Hill. The Wine which it produces, comes nearer to that of *Chassagne* than to any other. It is very excellent, and is drank in foreign Countries.

Chambertin produces, to my Liking, the most valuable Wine of all *Burgundy*. It is situated between *Dijon* and *Nuis*. It contains the Qualities of all the other Wines without their Faults. This is what one may forget without Fear. I have drank it six Years after it has been produc'd, and it pour'd troubled and thick into the Glass, but grew clear immediately, and by its Motion recover'd its Spirits, and a Colour the most lively and neat: And they also sell it as dear again as the other Wines of *Burgundy*. It was sold the last Vintage but one for forty and forty-two Pounds *Sterling* the *Cbantier*, when the Wines of *Volnet*, *Pomard*, and *Beaune* sold for not above twenty Pounds *Sterling* a *Queüe*, which contains, as I have said before, four hundred and eighty *Paris* Pints.

The third Article, of White-Wines.

Before I begin to treat on White-wine, it is proper to let you know that it is made from a masculine kind of Grape. This has two Qualities that the Grapes of the other Colour have not. The first is this: That if the Vintage be late, and that the white Frosts and great Cold come, it resists the Hoar-Frosts; while the black Grapes grow sour, withered, and shrivell'd immediately.

The second is, That assoon as these white Grapes are cut, they must be put into the Press without entering the Vat, and without being trod as the black Grapes are; for if they were put there, they would give only a livid, ruddy, yellowish Liquor. I thought myself obliged to acquaint the Publick with that.

Mulsant is, after *Beaune* and *Nuis*, the largest Vineyard of *Burgundy* in Extent; its Wines are generally approved in *Germany* and the *Low Countries*, and throughout all *France*; I know not whether they are so in *England* or not. The Wines which this Soil produces, in all hot and dry Years, are delicious, sparkling, agreeable, warm, and beneficial; they are not dear; and if they were well chosen, they would be an Honour to *England*, and Pleasure to those that drank them. When they are kept above a Year and half, they sometimes grow yellow and eager.

Puligny is a Vineyard next to *Mulsant*, but much more in the Plains, which produces the best White-wines; they are, within a very little, of the same Quality with the Wines of *Mulsant*, but their Fame is not divulged, and the Name is almost unknown.

Aloffe, of which I have spoken in the Article of the first Wines, produces also excellent Wines.

Morabet is a little Plot of Ground between *Chassagne* and *Puligny*, in the Plain, which is in the Possession of one Vein of Earth, which renders its Soil wholly of the same Kind; it produces a White-wine the most curious and most delicious in *France*; there is no Wine of *Cote Rotie*, *Muscat*, nor *Frontignan* that equals it. It produces but a very small Quantity, and it sells very dear; and in order to have a small Quantity of it, it ought to be bespoke a Year before; because this Wine is always bespoke before it is made. But great Caution is to be taken not to be deceiv'd, for the neighbouring Vineyards of this Clove partake a little of the Quality, and oftentimes pass for *Morabet*, and therefore it will be absolutely necessary to have a faithful Correspondent. This Wine has those Qualities that neither the *Latin* nor the *French* Tongue can express: I have drank of it of six or seven Years old, and am not able to express its Delicacy and Excellence.

I am now going to treat concerning all the Vineyards of the *Upper Burgundy*; those who have pass'd the grand Road that leads from *Dijon* to *Lyons*, the Length of the Hills, will do Justice to my Exactness, and I desire those

that have not been there, to believe that this Relation is agreeable to Truth.

I have an hundred times heard Boasting of the Wines of many Hills near *Auxerre*, to which they give the Name of the Wine of *Burgundy*: It is true, those Hills are in *Burgundy*, but they are ninety Miles distant from the true Hills, of which I spoke just now, which only produce these Wines of *Burgundy* which are in Reputation, and which they drink after two Manners, by the Nose and by the Mouth, either both at once, or separately; both at once, in that when one drinks them, the Pleasure which he has in the Smell vies with the Relish it has on the Palate; and separately; so that a Person that has been used to drink it, may know whether it be the true *Burgundy* or not by the Smell or sweet Odour. The good Tasters taste it by their Nose, before they put it to their Mouths; and all the other Climates of *Burgundy*, as those of *Chablis* and *Auxerre*, have no such Quality as the true Wines of *Burgundy* have, altho' they are really made and produc'd there.

It remains for me to relate how these Wines may be brought to *England*. It has always been the Custom to bring those Wines from *Burgundy* in their Casks; but as the Carriage is long, and there is oftentimes a Risque run, so the Carriers as well by Land as by Sea, are not always faithful; for notwithstanding all the Precaution that can be taken to hinder them from drinking the Wine, they will always find out Stratagems to do it. If it be packed up in Casks with Straw and Linen Cloths, this is but a feeble Obstacle to their Industry. And for all this Precaution, if the Cask happens to leak by the Way, this will be at the Peril and Loss of the Purchaser. If these Wines be put into double Casks, this Precaution will have no better Success than the foregoing, and is expos'd to the same Risque; and the Casks at the Vintages are a great Prejudice to these delicate Wines, because this gives the full Scope to the Spirits to evaporate; and of consequence this will cause a great Diminution of the Quality of the Wine.

It ought to be brought in Bottles from *Beaune* to *London*: For this Purpose, some Agent, who buys the Wines by Order of the Person, should be address'd to, to draw it out into Bottles, and to send it in Cases into *England*. These Cases being fill'd, need but be carried by Land above ninety Miles to *Auxerre*, where they may be embark'd on the River *Yonne*, which passes into the River *Seine*, and from thence to *Paris*, and afterwards to *Rotien*, where are Vessels which pass very often to *London*.

If one would have them come from *Beaune* to *Calais* by Land, that will also be easy; for there are Carriers that go thither very frequently, who would go very willingly provided they could have Cases enough to load their Waggon.

The Agents of *Beaune* would also be very well pleased to bottle the Wine that they were order'd to buy, provided their Corre-

spondents would give Orders for enough to make a Carriage: As for Example, if two or three Persons would join to give Orders for a thousand Bottles, this would be a complete Carriage: And as those of *Volnet* draw their Wine into Bottles at the End of *December*, a Person that would have five hundred Bottles of *Chassagne* or *Nuis*, ought to join with another that would have the like Quantity. The Agent might bottle up these Wines a Year after the Vintage, either more or less; and the Purchasers might receive the Wines of *Burgundy* exquisite and delicious; and in like manner all other Wines that they have a mind to have. As to the Price of the Wines of *Beaune*, *Volnet*, *Pomard*, *Chassagne* and *Nuis*, it is pretty near equal, or at most the Difference is not very great. A *Quene* of *Volnet* Wine contains four hundred eighty *Paris* Pints, which will make five hundred Bottles, and will cost in the Country, some Years, ten, twelve, fourteen or eighteen, and at most twenty *Livres Sterling*. The Carriage may cost to *Calais* twelve or thirteen *Livres*; and afterwards from *Calais* to *London* a very small Matter: So that taking the Years one with another, the dearest Wine of *Burgundy*, except that of *Chambertin*, which is the dearest, would scarce, in *London*, stand in fourteen or fifteen *Sols* a Bottle, the Entry not being reckon'd in.

The Method of making Wine in Provence.

The Delicateness of the Taste of Grapes is not always a certain Proof of their Goodness for making Wine: It is not always with these Grapes so agreeable to the Taste that the best Wines are made: We should not be surpriz'd that our Wines are not the most exquisite, since we do not observe any Rule in the Choice of the Grapes, which ought to be done.

It is certain, that the Juice of Grapes of different Kinds, cannot but produce a confus'd Mixture, which suffers divers Alterations in the Casks, by the different Fermentations, which the sulphureous Particles of the Grapes excite there, by which they suffer themselves to be very easily opened at the Approach of the Heat. This is what happens to Wines which have been made of a Mixture of many Kinds of wild Grapes. Experience informs us, that Wine drawn from such Grapes, is very subject to ferment and grow foul, as soon as the Heats of the *Spring* begin to approach, which does not happen in the *Winter*, when the Coldness of the Air holds it, as it were, bound and embarrass'd by the sulphureous Particles of the Wine. It is the same thing in the Juice of the Grapes called *Clarets*, *Plan Efrans*, *Pignoulets*, &c. when they are mingled in too great a Quantity with the others. The common Fault of our Wines is, that they cannot be kept the Year throughout; they are apt to grow foul, or turn, as it is called, upon the least Transport.

The greatest Part of our Citizens believe it to be the Fault of the Soil, principally the Vineyards

Vineyards planted in the Places where Plaster or transparent Stone is made, under which is contain'd all that Extent of Ground, which begins from R. P. *Capucins*, as far as *Aguilles*, which they commonly call *Payblanc*, i. e. White Country. But how many Vineyards have we planted in different Soils, that are subject to the same Vice? It is generally agreed, that the Soil which they call [*Gres*] Grey, is the best for Vineyards: Nevertheless, it is found, that the Quarter of *Molieres*, of *Repentance de Barret*, of *Montaignez*, are not exempt from this Vice. I am of the Opinion, that it proceeds from the Mixture of too great a Quantity of different Sorts of Grapes. I cannot deny, after Experience, but the Nature of the Soil, the Culture, and the Dung they use, contribute very much to this Vice, which is what I shall hereafter examine into.

Therefore it is necessary to know, what Grapes are fit to make good Wine, that may be in a Condition to be kept without being foul, or turning, and how to make it.

It is very true, that a Person cannot make from one Vineyard a great Quantity of Wine, that shall be at the same time good in Quality. A Vineyard ought to be planted on those high Grounds or Hills which are expos'd either to the South or the South-West.

And the Soil ought to be a sort of Brown, or approaching to it. Those which we call *Arpielo*, *Malause*, *Saveon*, are Soils which are scarce proper to nourish Stocks that will produce Grapes for making good Wine. The Vineyards which are round about the *Peres Augustines Reformers*, commonly call'd *Saint Pierre*, are planted in a Soil of *Saveon* aforesaid, very unfit for producing Grapes of a delicate Relish, or for making good Wine.

The Entrance into the Territory of *Tbolonet*, is, for the most Part, a Soil which our Country People call *Malause*; and also the Wines that they produce are none of the best.

Those Grapes ought to be chosen which grow upon Stocks that are planted in a Soil somewhat Rocky.

After the Culture, it is very certain that good Wine cannot be drawn from Grapes that have too much Nourishment, and of which the Sap has not attain'd the last Degree of Concoction or Ripeness.

Those which we call *Ollieras*, which are commonly dunged, and which they cultivate with Pains, do give a great Quantity of Grapes, but their great Nourishment is an Obstacle to their making good Wine. Those which we call *Open Vineyards*, are to be preferr'd to them.

We ought also to prefer the Grapes of old Vineyards to those of young ones. The proper Vineyards for making good Wine, are those which have been planted twenty-five or thirty Years; the older they are, the more proper they are for making good Wine; and till the Vineyard has been made seven or eight Years, good Wine ought not to be expected from it.

As to the Choice of Grapes, we ought to mix some of the best Sorts that we have. These

Kinds are, of the White Grapes, the *Aragnan*, the *Reudeillat*, the *Paseau Blanc*, the *Estrany*, the *Uni*, the *Aubré*. Of the Black, the *Catalan*, the *Bouteillan*, the *Uni Nègre*. The Must that is drawn from these Grapes ought to ferment in the Vat at least three Weeks; when the Husks must be separated from the Must. It is a common Error in this Village, not to let the Wine ferment long enough.

It ought to be noted, that the Proportion which should be kept between the Quantity of these Kinds is different, according to the Design which every one has of keeping these Wines.

The Black Grapes, and above all the *Catalan* and the *Bouteillan* should make more than half the Quantity of all the rest.

Those that desire to have a Wine of a deeper Red, should take a greater Quantity of black Grapes, and ought to let them stand a longer Time in the Vat, if they have Occasion to change the Wine from time to time.

They make white Wine of the Grapes they call *Aubier*, *Uni*, *Roudeillat*, *Aragnan*, *Pignolet*. If they would have Wine proper to keep in the Heat of the Summer, they ought to use none but *Uni*, *Aubier*, and *Aragnan*.

No body is ignorant that we have Wines that are made but of one Species of Grapes; as that of *Muscat* Wine, and *Claret*: For the first, they make Use of *Muscats*, as well white as red; for the second, of the Grapes they call *Clareto*.

They keep these Grapes with us during the whole Winter, and some Part of the Spring, hanging upon a Beam in a Room. All sorts of Grapes are not fit for keeping; those Kinds that are call'd *Pendoulans*, or *Rin de Panse*, *le Land de Poïere*, *le Verdau*, are the best for this Purpose; the *Aragnan*, and *Estrani* are so likewise; also the *Clareto*, the *Muscat* and the Red *Uni*: The *Barbaroux* and the *Espaguin*, the *Taulier* and the *Roudeillat* will not keep so long. They ought to be gather'd full ripe, and before the Rains, and to chuse none but those that grow upon old Stocks.

They also preserve those Grapes to make what the *Latins* call *Uva Passæ*; not because dry'd in the Sun, but because they are expos'd to the Sun hanging: They call them in *French* dry'd Grapes: The *Provincials* call them *Panfes*. They make use of none but Grapes commonly call'd *Rin de Panse* or *Pendulem*, or of *Rin Panse Muscat*, to make the best *Panse*. They also make use of the Grapes which are call'd *Aragnans*, which is the most common *Panse* in the hottest Places.

They also make use of the Grapes call'd *Roudeillats*, and the *Plan Estrani*. The Grape which we call the *Land de Poïere*, is not made use of with us for this Purpose; altho' I have been inform'd that they are used in hot Countries near the Sea-coasts. They make their *Panfes* with us after the following manner: They tie the Grapes in a String, and put them upon another String at both Ends; then they plunge them into a boiling Lye, in which they mingle a little Oil, until the Grapes shrivel, and afterwards expose them to the Sun for
six

six or seven Days, and then they lay them in Rows in Cases, or in what we call *Escortins* or *Consigns*, pressing them gently.

No body is ignorant that the Juice of Grapes fermented in the Vat, and made into Wine, is a Liquor so precious and delicious, that it furnishes us with a medicinal Aliment, and an alimantal Physick; the Virtue of which is perceiv'd both in the Body and Spirit. It is not without Reason that it is call'd *Lac Semile*, i. e. *Old Mens Milk*, &c. and *Femes Ingenii*, the *Tinder of Wit*; by *Homer*, &c.

Wine is different in Virtue and Delicacy of Taste. The Difference proceeds for the most Part from the different Nature of the Grapes with which it is made; the different Degree of their Maturity, and the Diversity of the Soil where the Vineyards are planted; and also the different Culture of the Vineyards, and the Preparation of the Wine; to which may be added, the Difference of the Climates, according to the greater or lesser Degree of Heat.

The *Romans*, as we learn from *Pliny*, were very curious in searching after the most excellent Wines; all their Differences consisted in the Places where they were made: As the *Setinum*, the *Cæcubum*, the *Falernum*, the *Gauranum*, the *Faustianum*, the *Albanum*, the *Surrentinum*, the *Massicum*, which were the most delicate Wines of *Italy* in the Time of *Pliny*. Among the Wines of *Greece*, they esteem'd the *Maronean*, the *Thasian*, the *Cretan*, the *Coan*, the *Chian*, the *Lesbian*, the *Icarian*, the *Sinyraan*, &c. Their luxurious Taste carry'd them in Search of the Wines of *Asia*, as that of Mount *Libanus*, and others, as may be seen in *Pliny*.

It is to be noted, that the *Romans* had their most excellent Wines from *Campania*, which is now call'd *Terre de Labour*, a Province of the Kingdom of *Naples*. Those of the other Parts of *Italy* did not come near these last in Point of Excellency: The *Falernian*, the *Gauranian* and *Massic* were made from Vineyards planted on the Hills round about *Mondragon*, at the Foot of which passes the River *Gargiliano*, antiently call'd the *Iris*. The *Cæcuban*, which differs nothing from the *Falernian* but in Age, (this is that which the *Latins* call the Length of Time which the Wines are able to preserve their Strength) was produc'd in the *Terre de Labour*, were as the *Fundanum* and *Amyclum* near *Gaeta*, the *Suessanum* of *Suessa Pometica*, a Maritime Territory of the Kingdom of *Naples*; the *Calenum* about the Town of the *Terre de Labour*; and also many others, which that Province furnishes the City of *Rome* with.

These Wines, which are very excellent in their Nature, acquir'd rather by Age than by Art, a Degree of Perfection to which none of the other common Wines of *Italy* can attain to.

The last, which the *Greeks* call *Oligophora*, and the *Latins* *Tenuica* and *Paucifera*, are very easily preserv'd by the Cold, or rather by a fresh Air, and grow eager by Heat. Also those which the *Greeks* call *Polyphora*, or *Mul-*

tifera and *Vinosa*, become more vigorous and spirituous by the Heat.

The Grapes of which the first are made, abound in crude Phlegm; the sulphureous Parts of the Must are more dilated. The last, on the contrary, are drawn from Grapes that are more ripe; of which the Must or the sulphureous Parts which compose it, are concentrated and fix'd by the Evaporation of the humid Parts which dilate it. To this may be added, the abundance of the Sulphur of these last, which is the Cause of the true Strength of these Wines; and it is by being open'd that they acquire this Spirituousness. It was only to procure this Opening, that the Antients invented the preparing these Wines in the manner I am going to express.

Pliny informs us, That in the Year 633, from the Foundation of *Rome*, they lodg'd their Tuns full of Wine in Places cover'd which were expos'd to the North, such as we now call Cellars.

On the contrary, those Casks which were fill'd with vigorous and spirituous Wine, such as *Polyphorum*, were set in an open Place, and expos'd to the Rain and the Sun, and all the Injuries of the Weather: Those which contain'd Wines of less Strength, were kept under Covert: Those which were full of a weak Wine, were put into a hollow Place, and cover'd with Earth.

Galen, in his Book *de Antidot. Chap. III.* and in the *Treatise of Vines*, that is ascrib'd to him, remarks very much to the Purpose, That the Wines of the first Order, or *Polyphora*, were preserv'd two or three Years in these cold Places; but if they let them lie there too long, they grew eager, if they did not remove them to warmer Places; as they us'd to practise in *Asia* before the *Romans* had any Knowledge of it; and it was by this Means that the People of *Asia*, as well as the *Romans* and *Greeks*, attain'd to the Art of making Wines keep so long.

The most antient *Epocha* of the Preparation of these Wines among the *Romans*, (as *Pliny* says) was about the Year of *Rome* 633. This Author, who liv'd a long time after in *Vespasian's* Time, assures us, That these Wines had been kept for the Space of an hundred Years, and that they grew thick to the Consistence of Honey; so that they could not be drank without mingling them with Water.

He also adds, *Quo generosus est Vinum eo magis vetustate crassescit*; i. e. By how much more generous the Wine is, by so much the more it grows thick by Age: The same that is seen in our Days in the *Spanish* Wines.

This Thickness of the Wines, of which I am speaking, is less extraordinary than that of the Wines of *Asia*, of which *Galen* speaks in his Book of *Respiration*; which being inclos'd in large Flasks, and suspended near the Fire of their Chimneys, acquire, by the Evaporation of the Humidity, the Hardness of Salt. What *Aristotle* says of the Wines of *Arcadia*, expos'd to the Fire and the Smoak, is yet more surprizing: *Ita exsiccat in utribus ut dera sum bibatur*; i. e. So dry'd in the Bottles, that it is scrap'd off to be drank: It was so solid, that they

they were forc'd to scrape the Flasks to drink it, and could not drink it without diluting it with Water.

The Romans prepar'd their Wines after the following Manner: They took the Must that had run from the Grapes that had been trod; they put them into a wooden Vat, of which the Staves had been bound together by Hoops or flexible Bands.

After the Wine had been fermented all the time necessary for separating the grossest Impurities, they drew it out of the Vat, to put it into the Casks; where it continu'd to ferment, and to assist the Depuration, they mingled as much Plaster, or Chalk, or Clay, or Powder of Marble, or of Pitch, or of Salt, or of Rosin, or of Lee of new Wine, or of Sea-water, or of Myrrh, or of Aromatick Herbs, as they judged necessary; every Country having its particular Mixture. And this is what the Latins call *Conditura Vinorum*.

They left the Wine in the Casks until the Spring following; also many left them till the second or third Year, according to the Nature of the Wine and the Country; afterwards they drew it out, to put it into Earthen Vessels which they did over on the Inside with melted Pitch, and mark'd on the Outside the Name of the Place from whence the Wine was made; and that of the Roman Consuls, in whose Consulate it was made. The Latins call'd this changing of the Wine from Casks to Earthen Vessels, *diffusio Vinorum*, or *Vina defendere*.

They had two different Sorts of Vessels; the one the *Amphora*, and the other the *Cadus*. *Pancirollus* and others say, The *Amphora* was of a square or cubic Figure; as to the Contents, Authors are not agreed, but most suppos'd they held about eighty Pounds of Liquor. This Vessel was contracted at the Neck. After it was fill'd with Wine, they stopp'd the Mouth close with Cork. The Cade was of the Figure of a Pine-Apple, which is suppos'd to contain half as much more as the *Amphora*. These Vessels being stopp'd, were carried into a Room expos'd to the South, situated in the highest Story of the Country-house where the Wine had been prepar'd. This Place was call'd *Apotheca*.

It was to dissipate the superfluous Humidity of the Wine, that they expos'd these Vessels to the Heat of the Sun, and of that of the Fire and of the Smoak, which has given to this Place the Name of *Fumarium*, because of the Smoak which was gather'd by the Funnel, through which the Smoak of the Fire was carried off, when it was lighted below.

These Wines could be kept for two hundred Years, and would, as has been said, arrive at the Consistence of Honey; during which, *Adhuc Vina ducentis fere annis jam in speciem redacta mellis asperi, etenim hæc natura Vini in vetustate est*, says *Pliny*, Lib. xiv. cap. 4. So that it is troublesome to drink this Wine because of its Thickness; and in order to render it drinkable, they diluted it with warm Water, to give it a Fluidity, and afterwards they pass'd

it through a Strainer; and this they call'd *Saccatio Vinorum*, as *Martial* says,

Turbida sollicito transmittere Cæcuba Sacco.

It is true, they had other Wines of the same Nature, which they did not pass through a Strainer; as the *Massicum*, which they only expos'd during a Night to the Air, to procure a Fluidity and Depuration; as *Horace* says, Lib. ii. Sat. 4.

*Massica si cælo supponas vina sereno
Nocturnâ, si quid crassi est tenuabitur aurâ,
Et decedet odor nervis inimicus: at illa
Integrum perdunt lino vitata saporem.*

This luke-warm Wine had been very disagreeable to drink, if they had not cool'd it with Ice or Snow, whether in mingling it with the Wine, or setting the Bottles in Ice: The most Luxurious mingled the Snow with the Wine, and pass'd it thro' a silver Strainer, which *Paulus* the Jurisconsult calls *Colum Vinarium*.

Of the Method of Planting Vineyards in Orleans.

Of the Distance that may be given to the Ridges, and to the Paths when a Vineyard is planted. The different Kinds of Plants. Of planting between, and of plucking up old Vines, and planting again.

The Rows ought not to be open'd till after the Ground that is design'd to be planted has been mark'd out; to the end, that a Length and Breadth proportionable and uniform may be given to all the Ridges and Paths, as much as the Ground to be planted will permit. And forasmuch as the Vine receives its Nourishment in the Ridge, it will be proper to give it some Inches in Breadth more than to the Paths.

The most common Practice is to allow five Feet in Breadth for the Ridge and for the Path when red Wines are planted, especially the *Auvergnats*, whose Branches ought always to be train'd-in pretty long. This is the best Method for this Sort of Vines: And the Plants ought to be planted two Feet three Inches distant one from another. Some do not exactly observe this Distance, they allow but four Feet and an half for a Ridge and for a Path.

There are also some that allow but a Foot and an half Distance between each Plant, when the Ridge and the Path have no more Breadth than that which I am about to mention; but the Vines of these Plants planted so close together, ought, of Necessity, to be twist'd circularly; and as their Roots will, in a few Years, run one into another, the Vines will not last so long; besides, they will require to be a little oftener and more plentifully dung'd than those that have been planted at a greater Distance.

There are scarce any but *Vignerons* which allow so little Breadth to their Ridges and their Paths, and who plant their Vines so near one to the other, because they are often renewing their Vines, from whence they have always

young ones, which gives them Occasion to have their Lands trenched; from whence they gain'd more Advantage than the Citizens, who might therefore do the same.

Others, on the contrary, allow near six Feet for the Breadth, and sometimes more for the Ridge and the Path, but this certainly is greater than is possible to dig or cultivate between the Legs; which is the best Manner of performing this Work. And when they dig otherwise, they will have a great deal of Trouble to work to the Middle of the Ridge, which nevertheless ought to be as well digg'd as the rest.

But the *Vignerons* of *Burgundy* do not work so far; when the Ridges are so large, they content themselves to touch but lightly the Middle of these Ridges, and they dig the Rows of Plants a little less. It is then advantageous for the Citizens not to give so much Breadth to the Ridges.

Those *Vignerons* that purchase Vineyards which have the Ridges so wide, pluck them up oftentimes, that they may be able to plant others there, where they allow much less Breadth for the Ridges and the Distance between the Plants, without concerning themselves about the *Vines* lasting the less while.

But the Citizens ought to follow a better Method, which is to give five Feet for the Breadth of the Ridge and the Path, and two Feet three Inches for the Distance between each Plant, especially when one plants *Vines* of *Auvernat*; because being furnish'd with Runners, the Ridge must necessarily be larger, and the Plants at greater Distance the one from the other, that they may find more Nourishment, and that the Shoots of the *Vines* may be extended the better.

A Vineyard planted after this Manner will last longer, will defend it self better against the Winter's Frosts, will produce finer and better Fruit, which will ripen better and of consequence make better Wine; and also the *Vignerons* of *Burgundy* would find their Account in planting of their *Vines* in this manner, in that they would have fewer *Vines* to tie, to prune, and to disbranch, &c. because there are a great many fewer Plants in those whose Ridges and Paths are wide, and the Plants less crowded; and for this Reason there would be but few *Vignerons* but would be of this Opinion.

When I say, that when one plants *Auvernats*, they should have five Feet in Breadth for the Ridge and the Path, and two Feet three Inches Distance between each Plant, I speak of those *Vines* planted in a very good Bottom of Earth, because they will last many Ages, being renew'd after the usual Manner.

For as to those Lands where one is oblig'd to renew the Vineyard in about twenty or five and twenty Years, it will be sufficient to allow four Feet and a half for the Breadth of the Ridge and the Path, and twenty Inches for the Distance between each Plant; because this *Vine* will not last a very long time, by reason the Roots will grow large and spread far in the Earth in such a manner that they would injure

one another. I suppose nevertheless this Land to be passably good, for otherwise the Breadth of the Ridge and the Path must be greater, and the Distance between each Plant, or the Vineyard, must be the oftener dung'd.

The *Paillots* are almost all compos'd of two Ridges, which contain four Rows; to which they allow nine Feet in Breadth, to the end not only to hinder the too great Heat of the Sun from scorching the *Vines*, that are planted in a Land that is of a burning Quality, (for it is only in such Lands that they make *Paillots*) but also in order to provide that the Plants may receive the more Nourishment, and that the Rain which falls may not so easily drain away, but may remain a long time upon those Lands that can never have too much of it; and it is for this Reason, that one is oblig'd to plant there before Winter.

These *Paillots* are planted as the other Vineyards, where they allow four Feet and an half for the Ridge and for the Path, and as one *Paillot*, and its Path has ordinarily but nine Feet and a half of Breadth, so their Plants are distant the one from the other, pretty much the same as those *Vines* planted after the Manner I am about to speak; which may be easily understood by the Quantity of Plants which there are in the Vineyards, planted after these different Manners.

They fashion these Plants of the *Paillots* as those which are planted in Ridges; and the Year after they have been planted, they join two together, which form a *Paillot*. It is requisite that the Land which one designs to plant with *Paillots*, be dispos'd as that which is planted in Ridges.

There are three Sorts of Plants; those from Cuttings, from Layers, and the old *Vines* that are pluck'd up to be replanted.

The two first Kinds are very well known by *Vignerons*, and the third but very little; but they are never the worse for that, as I shall make appear in the following Articles.

The Cutting is a young Shoot of the Year that has no Roots: They always leave at Bottom a Knot of the Wood of the preceding Year. These are the most commonly us'd. They give it no other Management, than to cut off the * Claspers and the Tops at the same time that they take 'em off from the *Vines* and lay them down in the Earth in a Bundle, when they cut them before Winter, and cannot plant them till the Spring.

This Plant is good, and commonly succeeds when it has been well chosen, being planted in Lands well dispos'd, and well cultivated; but yet there is an Inconveniency in using it,

* *Druges*; i. e. the young Suckers or Buds, which usually push forth after they have rubb'd off the Buds of the *Vine* at the Height of the great Props. These *Druges* begin to push sometimes long before they are rubb'd off, and often produce Grapes; these seldom ripen, because they do not flower till towards the End of July. These *Druges* do ordinarily proceed from those *Vines* that push with a great deal of Force and Vigour.

and

and that when it is to be planted in Lands that are naturally moist, or that retain the Water: If it be planted early, and there fall cold Rains in great abundance, the Plant soaks in the Water, and the Skin or Rind comes off, and it perishes instead of taking Root: And if it be planted too late, and the great Heats and Droughts overtake it before it has put forth Buds that are passably strong, it is scorched; wherefore it is better to make use of the second Species of Plants, not only in these sorts of Lands, but all others.

The Layers are the long Shoots of *Vines* of three Years Growth, which have small Roots, and are better, and less liable to fail. These may be planted at all times, and in any kinds of Land, provided they are such as don't retain the Water. In this case, it were better to wait till *March* to plant them, or at least till the Ground appears healthful, for we should never plant in Ground which is very wet.

Before the Layers are planted they ought to be pruned, that is, to cut off a few of their Roots; and when they are weak at the Place where they were bent, these must not only be cut, but also the other Branches or Spurs, leaving that which has the most and strongest Roots.

The Layers are a great deal less subject to soak in the Water than the Cuttings; because having Roots before they were planted, they make new ones sooner than those which have none.

It is true, these Layers are more rare than the other, but it is an easy matter to render them common enough, because one may have whole Acres of them: And all the Precaution that is necessary for it, consists in making Layers, when they are well grown, from the Cuttings.

These may be planted in two different Places, either in some Piece of Land design'd solely for this Purpose, or in the Middle of each Ridge, at the Time that a Vineyard is planted.

If they be planted in a particular Piece of Ground, they must be laid in Rows betwixt the *Vines*, and there so, that betwixt each Row and the Shoot there may be a sufficient Distance, that the Shoots may not hurt one another, and that the *Vignerons* may have Room to pass between them when he is trimming them; for he must hoe them three times a Year, to hinder the Weeds from growing about them and choaking them, and depriving them of Part of their Nourishment. These may be taken up at the End of two or three Years, according to their Strength.

This Portion of Ground is a Sort of Nursery, since the Gardeners make them, that they may have Plants to plant in those Places where they are wanting.

I am also of the Opinion, that it is the Prudence of a Citizen to have on his Estate, (especially since the Cuttings do not take Root but with Difficulty) a Place where he may always have Layers in as large a Quantity as he pleases, or shall suffice for all those that shall

not succeed, at least if they be not well chosen, and which require a particular Care in their Cultivation.

I shall consider, at the End of the following Article, after what manner we should plant the Layers in the Ridges.

It is for the Interest of a Citizen to order his Affairs so that his Vineyard may be always full of Plants, to the End that it may produce a good Quantity of Wine, because it often happens, notwithstanding all the Precaution that can be taken to keep a Vineyard well furnish'd, that it will want to be supply'd, by reason of the Quantity of Plants that die from time to time; and because one cannot always supply their Places by the Means of Layers; and because sometimes there will not be Wood enough upon the *Vines* that are near for that Purpose, and that it would not be proper to make use of the Top of the Shoot for several Reasons that might be given; and therefore it will be proper to place Plants between the others.

Some *Vignerons* will say, that it is very rare that these middle Plants succeed in a Vineyard where they are planted. To which it may be answer'd, That it is true, that a middle Plant may not succeed, when the Earth has not been well prepar'd before the Planting, or when it has no other Management but that of the Vineyard in common; but 'tis very certain that it will scarce fail, if Care be taken, after the Vintage, to pluck up the dead Shoots, to open the Earth to a good Depth before Winter, not only to the End that it may mellow, but also that the *Vines* may not be damag'd in cutting off Part of its Roots, by which it would greatly be weaken'd, if it were not done before the Spring; and if in every Hole were put a Basket of fresh Earth, or about the twentieth Part of a good Scuttle-full of well-rotted Dung, especially when the Plant is set in stony, clayey or gravelly Ground; for if it were too hot, it might burn the middle Plant, or breed Vermin, which would gnaw the Plant and kill it; also to tie the *Vine* after such a manner that its Shoot may not hurt the middle Plant, and, in fine, to clear round oftener than the *Vine*, in case it has need; for it will be difficult for it to take Root, if the Weeds choak it: And this is the Reason, that among the Works relating to *Vines*, where, as often as the Weeds appear, it is convenient to hoe all the Shoots that have been newly planted, it is always best to give this small Stirring immediately after Rain.

I have seen among *Vines* very strong in Wood, and of an hundred Years of Age, a middle Plant very strong to the third Eye, and which always continu'd to do well; and I can affirm, that these *Vines* are planted in as strong Lands as any are in our Plot of Vineyards. Now if the middle Plant does well there, as it is certain it does, we may take it for granted, that it will still do better in those Lands which are light: And hence it is, that there is not any Land where one may not plant it, or where it will not succeed.

Perhaps

Perhaps the *Vignerons* may say, that a middle Plant will be worth nothing among young *Vines*, because these push with so much Force, that their Shoots would choak it.

I agree that it may sometimes so happen ; but then this is a Proof, that the Year following there will be found in this Vineyard Wood enough to make Layers there : In like manner, it would be useless to set a middle Plant, because it is more likely to fail, and because it will not produce Fruit so soon as the Layers, which produce it the same Year in which they are made.

This Reasoning is more just than the Consequence that they would draw from thence ; that is to say, that it would be useless to plant a middle Plant : For if a *Vignerons* should have the Malice every Year to cut off the Wood of the Vineyard, which might serve for the making the Layer, and not set a middle Plant there, the Vacancy that would be there, would never be fill'd ; and this is the Reason that a middle Plant should every Year be set in the empty Places, to the End that they may be fill'd out with the Layers. But this middle Plant doing well in the Vineyards of the *Vignerons*, I cannot see any good Reason that it would not succeed equally in those of the Citizens, where the Plants are commonly planted at a greater Distance one from another than in the Vineyards of the *Vignerons*, where the middle Plant does very well.

The Plant of old Vineyards, or rather the old *Vines* also plucked up to be replanted, is yet another Species of Plant which, without doubt, appears to the *Vignerons* a Novelty which surprizes them, because it is not in their Practice, that is to say, in their Heads.

But the Method that I propose will not thence be the less good in itself, and will not fail to succeed, provided that the Earth, which is design'd to be replanted with these old *Vines*, has been well prepar'd, and if what I shall direct be exactly observ'd.

It frequently happens that one has old Vineyards, of which the Plants are not equally good ; and where there is so great a Quantity of Plants wanting, that instead of filling it by Layers, Shoots, or middle Plants, the void Space that is there will cause one to determine rather to pluck them up, because the *Vignerons* have an ill Opinion of the Layers and Shoots, and they will say, that these Plants set between will not succeed.

The best Method that a Citizen can take on this Occasion, is to pluck up a Vineyard when he finds it in this Condition. But as it is the Custom to allow the *Vignerons* all the Wood for his Labour of plucking it up, because they think the Wood is good for nothing but to burn, I would give them to understand, that they may make a great Advantage of it.

I suppose, in the first Place, that these old *Vines* are of a good Kind. In the second Place, that, if there are any Shoots of a bad Kind, Care has been taken to cut them down to the Ground some time before the Vintage, or some Years before one pluck up these *Vines*,

to the end that they may not be confounded with those that are reserv'd to be replanted.

In the third Place : If the Land where one would replant these old *Vines* has been well prepar'd ; or in case one has a Mind to replant the same in the Ground from whence they have been pull'd up, and if it has been plentifully dung'd :

All Things being prepar'd, there needs no more but to know after what manner these old Plants plucked up, are to be cut before they are replanted.

Before this sort of Plant is put into the Ground, the Roots must be cut with a Hatchet, especially the biggest, and only leave two Knots of this great Root below the Stock, and at the Top the largest and youngest Shoots, provided that they are sound and healthful : Then in planting of them, the two Knots of the old Root must be buried, in case that it has large ones ; if not, the large Stock only down to the Place where the Shoots are produc'd, so that the young Wood may be two or three Inches cover'd : And in case it be too far from the Stock, you must make the End of the Shoot that is on the Side of the Stock go as far as the Row, and lay it sloaping, in case it be too long.

It ought always to be so order'd, that what young Wood there is bury'd, which comes out of the Ground, be cut near to the Surface only some Weeks before the *Vine* begins to push.

When this old *Vine* has been replanted, it ordinarily makes new Roots at the End of the old ; and when it fails to push at this Place, as it sometimes happens when it is too old, it infallibly makes new ones at the young Wood that has been buried ; and this old Root and the Stock rot some Years after the *Vine* has been replanted.

In the first Year this plant puts forth a Shoot above four Feet in Height, and also produces some Grapes which are pretty good, and ripen very well, when Care has been taken to cut off the Shoot at the proper Time.

The second Year, it gives more Wood and more Fruit, provided that it be cut low. And in the third or fourth, at the latest, one may have a full Vintage from it. I have seen in one Place in this Vineyard-Plot great Pieces of old *Vines* replanted after the aforesaid manner, which have, at the third Bud, not only fine Fruit, and a sufficient Quantity of it, but even to the fourth so well condition'd, that one might take thence a Plant without hurting the Wood which ought to be kept to serve for the *Vine*.

Nevertheless, these Lands which I speak of are not better than those of this Vineyard-Plot, for they are in the Parish of *Boigny*, and are not accounted any better than these are ; which makes me believe, that old *Vines* planted in good Lands would bear better there.

If there were any Reason to fear, lest the young Wood buried would soak in the Water, &c. in case that it were planted before Winter, it may be deferr'd till Spring, and then

then they must not fail to prune the Plant at the same time that it is put into the Ground, or some Days after.

Nevertheless, I believe that one may plant this old Plant at any time, and in any sort of Ground; because those that I have seen, which had been newly planted, have done very well in moist Lands.

But not to run too great a Hazard, the Experiment may be made after the Manner I propose, only upon some Ridges.

But some may say, To what Purpose should we bury an old Stock, which has often two Knots of the old Root, and one Stem? Would it not be better to plant none but young Wood of these old *Vines*, or to leave only the young Wood on one Part of the Stem?

I answer, That this last Method is not to be absolutely rejected, because, perhaps, it may succeed. Nevertheless, that which I propose being the more certain, because it is founded upon Experience, and the other yet has not, it ought the rather to be follow'd; for this old Root, this Stock or Stem, let it be as big as it will, is not so usefess as may be imagin'd, because it serves for a Reserve to keep in the Sap, and thence furnishes this young Wood, until it has made sufficient Roots where it has been buried, whence the new Roots are produced indifferently; for I have seen of them produc'd both from this old Wood and the new that has been buried.

I am of the Opinion, that there is Reason to doubt, whether one Part of a Stem can produce the same Effect, because it being slenderer, it contains much less of the Sap than a Stock join'd to several Joints of old Wood, united in an intire Stem.

Of the Time and different Manners of Planting a Vineyard.

Lands being of different Natures, there ought also to be different Times of Planting.

In Lands that are sandy or full of Flints, as those of *Olivet* and *St. Mesmin*, and others, the Bottom or Soil of which does not retain the Water, one may plant and interplant after the Leaves of the *Vines* are fallen, until the Beginning of the Severity of the Winter, without being under any Apprehension of the Plants not succeeding; because these sort of Lands never retaining the Water, are always wholesome at the Bottom, and therefore the Plants set in them will succeed.

They do not ordinarily plant in the Lands of *Olivet*, of *St. Mesmin*, &c. whole Pieces of *Vines* entire in the Places where they have been already, because the Custom is, not to pluck up in these Lands those Plants that they find good, either as to Wood or Kind.

As for myself, I have always found that these different Stools, mixed among very small ones, make a Grottesque Figure in one and the same Piece of Land, and could never approve of this ridiculous Method.

I think it would be much better to lay down these Twigs of *Vines*, as Layers, or

to pluck them up, and plant them again elsewhere; or to plant them in the same Place, cutting them after the manner as is done to old *Vines*, which are re-planted after they have been plucked up, as may be seen in the foregoing Article. But this last Method appears to me to be not so good as the first, which is, to make Cuttings of the Branches which remain upon the *Vines* that have been plucked up.

In strong Lands, or such as retain the Water, one ought not to plant but in the Month of *May*, or else the Beginning of *June*, because it is not easy to make a *Vine* take Root in these sorts of Lands, the Years being often very hot and dry, or very rainy, which are equally to be fear'd, in respect to the Plant set in them.

When the Rains are frequent and cold, the Plant imbibes the Water in the Earth; and when the Season is too dry, its Bark burns towards the Surface of the Earth. It is easy to remedy, or rather prevent this second Inconvenience, as will be made appear in the following Article. But as to the first one cannot do it; for it is very difficult to foresee the Time when it ought to be done. A Plant so imbibing is absolutely dead, past Recovery, and so there is no Remedy.

And as in an Estate of but a small Extent, it often happens that the Lands are of different Natures, and that of Consequence the Plants of one certain Species will not do well but in one Part of these Lands, and will succeed ill in another; and that the Seasons are different one from another: and since they too often happen to be either too hot, or too cold, or too rainy, and that the Kinds of the Plants are good or bad, according to their Nature, and that of the Ground on which planted, and the Disposition of the Season, I am of Opinion, to be more certain not to plant any Plants but what will succeed, and to have always some Vintage to gather, that it will be proper to plant several Kinds of Plants, according to the Lands that they will agree best with, especially if we be not very sure that one Species of Plant will do better than all others: In such Case, we should plant none but that which may succeed there.

When I say, that it is often advantageous to have different Kinds of Plants in a certain Extent of Land, I do not mean that you should put many Kinds or Plants in one and the same Ridge, or in one and the same Row, as is common for *Vignerons* to do, when they plant Vineyards for those who are oblig'd to make but one sort of Wine of all sorts of Grapes, which nevertheless they would have pass'd for pure *Auvernat*, although there is not in it, perhaps, above a third Part; but I mean, that in every different kind of Land, there should be planted but one kind of Plant, to the End, that every Kind being separate, we may, in the time of Vintage, easily make such Wine as we desire, which will be very difficult, if all the different Species of Plants be planted confusedly one among another; for there will scarce be found among the Vin-

tage, Gatherers, either Men or Women, such as have Skill enough to distinguish them; and besides, if they had, it would be a Loss of Time.

Those Citizens who would have on their Estates nothing but *Auvernat*, ought to watch their *Vignerons* while they are planting, for they have the Trick of mixing the hard *Sa-moreau* and *Gois*, and other bad Kinds.

And when a Citizen would make good Wine, he ought to examine whether the Grapes be come to their full Ripeness, and he is obliged to leave the bad Grapes that are not ripe, which the *Vigneron*, some time after, does not fail to take for his own Drink, to meliorate it, or to make Wine or Rape: But to remedy this Inconvenience, a Citizen ought to look over his Vineyards some Days before, to see whether his Grapes are equally ripe, and to take Notice which are less than the others, and which are not so good, and he should cut those Vines down to the Surface of the Ground; and the following Year he should give Order to his *Vigneron* to supply their Places by the Means of Layers or Cuttings.

A Vineyard may be planted after two Manners, either upon the even Ground or in open Rows.

In Planting upon the even Ground, when the Land has been levell'd and mark'd out, they make a Hole with a Spade to put in the Plant; but it ought nevertheless to be supposed, that this Land has been prepared and well trenched.

The Manner of Planting a Vineyard in open Rows is almost the only one in Use in the *Orleannois*, and is, without Contradiction, the best; in that it is certain, that in Planting in this Manner, the Earth has been open'd and remov'd even to the Bottom, which by this Means will become better furnished, and the Roots of the Vine will be capable of spreading themselves.

The best Time to plant Cuttings which have been bundled and buried in the Ground, is, when the Rind swells, which may be known by a kind of Protuberance, which rises round about the Wound, and also by the Buds being just ready to open; and that the Cuttings may not dry too much, they ought to be kept for some Time in a Vessel full of Water, and not to be taken from thence, but as they are planted; for if the Heat should shrivel those that are planted, they will not so readily take Root, and many of them might die.

For this Reason it is better to plant a Vineyard in a rainy, moist Season, or at least cloudy, than when it is too hot, or there is a too drying Wind.

The best Manner to lay down the Shoot of a Plant, is to put the End that is to be placed into the Ground on the Side of the Ridge, to the end that it may be able to strike out Roots from all the Buds or Eyes on both Sides, and that it may have Nourishment from the whole Breadth of the Ridge, on which the Earth ought to have been removed.

Some *Vignerons* of the Citizens lay down the Shoots of the Plant, not according to the Breadth of the Ridge, as it ought to be, but the Lengthwise of the Row, that is to say, all the Length of the Path; and I can't see the good Sense of this Manner of Planting; I believe those that do it, do it more out of Malice than Ignorance. Also the Wound of the Cutting of the Plant should be laid down side-wise to the Bottom of the Trench. When the Plant is laid down, and they would cover it, the large Clods of dry Earth should not be put immediately upon the Sets, for the Heat will easily penetrate through the Vacuities that it finds there, and dry the Plant, and hinder it from taking Root: For this Reason great Care should be taken to put the finest Earth, that has been most stirred, and is moist, and to press it down well with the Foot, to the end that the Plant being pressed on all Sides, and planted on a soft, moist Earth, it may strike Root the more readily and surely then if it takes the Air at any Place where the Earth does not touch all the Buds or Eyes where it forms Roots.

There must also be one good Bud at the Superficies of the Earth, because this is that by which the Vine must put forth.

For in the greatest Part of this Vineyard-Plot, the Custom is to plant a Vineyard no other Way but by Ridges; one Ridge is compos'd of two Rows, and when four of them are joined together, or only three of them, the Name of *Ridge* changes into that of *Paillet*, as may be seen at *Olivet* and *St. Mesmin*, and in the Places where the Vineyards are formed after this Manner.

There are also found ancient *Paillets* of eight Rows, which gives Reason to believe, that sometimes they planted upon the flat Ground in these Sorts of Lands, that is to say, had neither Paths nor Ridges.

They commonly make use of two different Utensils of Iron, to make the Hole where they put the Cutting of the Plant, either a Spade or a large kind of Pick-axe. The first is the most proper to make good Work, provided the Earth be wrought the whole Length and Breadth of the Ridge, and also the Depth that the Plant is laid, that is to say, as far as the Hollow of the Earth.

When they make use of the second Utensil, it is commonly with a Design to make bad Work; for the lazy *Vignerons* content themselves in making a Hole to put the Cutting of the Plant in, without digging the rest of the Ground.

But by this last Way of Planting, it often happens, that the young Roots of the Plants, finding nothing but a hard Earth, into which they are not able to penetrate, it is impossible that they should be able to extend themselves, as they would do, in a Land that has been exposed to the Air, Frosts, &c. by the good Digging that has been given it, when the Ridge has been dug with the Spade the whole Length.

This ill manner of Planting with the Pick-axe retards a Vineyard from four to five Years,

Years, and oftentimes the greatest Part of it dies: But this ought not to be surprizing, for this Land not having been turned topsoil, nor expos'd to the Air and to the Rains, which furnish the Salts necessary to Vegetation, it is impossible it should succeed, especially when it has not been often and plentifully dunged.

Although the Ridges are ordinarily compos'd but of two Rows, nevertheless there ought to be planted a third about the Middle of each Ridge, according to the Proportion of the Planting; and if one has not Plants enough to finish entirely this third Row, the same Year that the Plantation is made, it may be done the Year following.

It is very necessary to have this third Row, for it serves to fill those Places where the Plants are wanting in the Rows.

When one has a Design to plant a Vineyard under great Trees, or in Places more subject than the others, to the Frosts of the Spring, or to Blighting, &c. he must, in those Lands proper for *Auvernats*, put the black *Formente*, because they will better resist the Accidents that often happen to a Vineyard, and will produce more Fruit; and when a little Wood is left, its Fruit will ripen as well as the *Auvernats*, of whatsoever kind it be.

It is true, the black *Formente* has little of the good Quality of the fine Wines, and for this Reason it ought to be planted apart, and not to mingle it with the *Auvernats*; for it is better to have Regard to the Quality than to the Quantity of the Wine.

Among the White Vines one may plant the white *Auvernats* of the Low Country; this Plant produces Wine sufficiently good, provided it be set in a Land agreeable to it.

It will be proper for those who have many Acres of Vineyards to improve, to have one Part of young, and one Part old; because if one Year prove contrary to the other, it may be favourable to the other; and then neither will the *Vignerons* be so hurried in the Season of Pruning them, nor will the Master be so embarrass'd when he gathers his Vintage; for if his Vines were all young or all old, he will be oblig'd to gather them both at the same Time, if they have been planted in a Place where the Soil is of the same Nature.

Of the Care that ought to be taken of Plants.

To do this so that the Plants may succeed, it is not sufficient that the Plant be well chosen, the Land well prepared where it is to be planted, and the most convenient Time taken for Planting it, but there are still many things to be observed.

In the first Place, the Plant ought to be pruned eight or ten Days before it begins to put forth, because then the Buds being pretty large, it is easy to distinguish the Good from the Bad; which ought always to be done in such manner, that one good one may be at the Superficies of the Ground; and when it is found that that which has been left doth not put forth in its Time, you must softly with

the Hand un-earth the Cutting unto the first good Bud, that it may be expos'd to the Air, and may put forth the more easily; for if the Bud be not cleared of the Earth, the Cutting may rot therein; and a great Failure will be avoided in using this Precaution.

Secondly, To water the Plants, and that several times, when the Heat is violent and continual. The first time when they are planted, and when the Ground appears dry, and the Season dispos'd to be windy; the second eight Days after: in case that the Heat continues, one may give to each Plant three Pints of Water, and this should be poured equally upon every Part of the Plant.

The first time the Plant is watered, it is good to do it when it is not above half covered with Earth, to the Bud, that that Part which is lowest may be fresh and moist, that it may take Root the more easily.

These Plants should not be watered with any but Rain-water, which is the most natural to all Plants; but if that is not to be had, that of Ponds, Ditches, and Marshes should be used; but if instead of this Water there be used that which runs into a Pit from a Dunghil, it will have a very good Effect, for that is well furnished with Salts, and consequently very proper for Vegetation.

It is true, it will be difficult to have enough of this for a large Extent of Ground, but it should always be used where it can be had.

The Excellence of this Water will soon appear, by the Strength with which the Plant that has been watered with it will put forth.

The most proper time to water, is in the Evening, towards the setting of the Sun, and the Day following in the Morning, you may lay some Mulch upon the Ground: This will hinder the Earth from chapping, and the Heat from penetrating too far into the Earth, where the Plant has been planted; for it will have more Need of Freshness and Humidity, than of Heat and Driness, especially 'till such time as it has taken Root, which may be known by its budding out.

Some look upon this as an unnecessary Precaution, as to the Watering the Plants; but yet I am of Opinion, that there ought to be a Distinction made between fresh, moist Lands, where Watering may not be necessary; but it must be used to those which are dry and burning, especially when the Planting is done in the Spring, and sometimes so late, that the Drought surprizes the Plants before they have taken Root. It is true, Planting is ordinarily performed before Winter, in such Lands.

Thirdly, When the Plant begins to put forth, and the Heat is not too violent, you should give it some labouring, especially soon after Rain. In order to give them this Labour as it should be, there must never be suffer'd among these Plants any Legumes; particularly Great Gourds, Peas, Beans, Turnips, Leeks, and especially Cabbages, which will infect and impoverish the best Lands in a little time.

Of

Of the Damage that Fruit-Trees do to Vines.

If Trees planted round about Vineyards don't fail to hurt them, as has been before remarked, there is no doubt but that they will prejudice them much more, when they are planted in them.

And altho' some Advantage may be made of Fruit-Trees, nevertheless they should never be planted in Vineyards, because they never do better than when they are alone, and well cultivated; and for this Reason nothing but Vines should be planted in them, especially not Peaches or wild Quince-Trees; which should rather serve for Hedges, than to make Profit of; for these Trees planted in a Vineyard, eat and dry the Earth as far as they reach, and the Grapes that are under them have always less Taste, and ripen with more Difficulty than the other; because these Trees shade them, and hinder them from enjoying the Heat of the Sun, and the beneficent Influences of the Heavens.

And besides, when the Season of the Maturity of these Fruits approaches, and also oftentimes before that Time, the *Vignerons*, their Wives, their Children, &c. sling at the Pear-Trees, Props which they pluck from the Vineyard, which cannot be done without breaking a great many Shoots, and the Props bruising the Grapes, and spoiling the fallow Ground all round about these Trees, by trampling it.

If a Person will have Trees in his Vineyard, he should plant none but Winter Fruit, because these are commonly not gather'd 'till after the Vintage, then there would be fewer Inconveniencies to be feared; but yet it would be better to plant them any where else than in the Vineyards.

Walnut-Trees ought never to be planted in a Vineyard; for they are the most prejudicial of all.

The Osier also does great Injury to Vines, and especially when it has a large Stock; because being very large, the Roots must also necessarily be large, and extended in Proportion, which, without doubt, is prejudicial to Vines; for those which are near to these Stocks, have commonly slender, corrupted Wood, and bear very little Fruit, and that bad-conditioned.

Of the Gathering the Vintage.

The Vintage of the *Auvernats* being the most precious of all those which we have to make in this Plot of Vineyards; in order to have good Wine, we ought to attend the Maturity of the Grapes.

And as there are certain Soils, where the Grapes having been cut a little too green, are too much fermented in the Vat, and others, on the contrary, cut very ripe, are but little fermented, which keep the better; it is absolutely necessary, that those who have these Vineyards do carefully apply themselves to be acquainted with the Quality of their Ground.

But one may say in the general, of all the good *Auvernats* of this Country, that they ought to have always one Point of Green when they are gathered, particularly when the Year has been hot, and the Lands where they grew have been fat, or very much dunged: For it is not sufficient, when one would have good Wine, to cut the Grape in its Degree of Maturity, but he must take a fit Season to do this in: as thus; one ought neither to begin nor continue to gather when it rains, though many are not very scrupulous as to this Point; for they say, the Wine will sell never the worse for it.

I own that it may sometimes happen so, but it ought to be allow'd me, that it has a bad Quality. One ought also to see to it, that the Dew that falls often very plentifully in this Season, be entirely dissipated, and that there be no Dew either upon the Grapes or the Leaves of the Vines; for it is found by Experience, that for the little Quantity of Water there is in this Sort of Wine, it loses a great deal of its Quality.

Therefore the Season cannot be too fine for cutting the *Auvernats*, for this Reason; in a great many Vineyard Pots in this Kingdom, as in *Burgundy*, and other Places, where the Wines have so great Reputation, they don't gather their Vintage, but during the finest Part of the Day; that is to say, the Gatherers begin their Work very late, and leave off some Hours before Sun-set, and the Wine is the better for it.

It is true, that sometimes it is good to wait for the falling of the Rains, but this ought to be some Weeks, or at least many Days before the Vintage, and not in the Time of Gathering.

As for Example: When no Rain has fallen for a long Time, and the Grapes have been so shrivelled by the Heat, that there is scarce any thing but Grape Stones, and a tough, thick Skin; if one should gather them then, they would yield but very little Wine, and also it might turn to a Tartness, as it happened, for the most part, to the Red Wines of the Year 1718. which was extraordinary hot and dry.

So then we ought not to gather the Grapes so soon as the Rain that we have waited for is fallen, because the Grapes ought to have Time to have the Advantage of it, which may be known when the Berries grow large, and fall upon the Ground.

As to the other Plants, red or white, they may be gathered with less Precaution; but they must always have their Degree of Ripeness, according to the different Lands on which the Vineyards are planted.

When there are found among the *Auvernats*, Vines whose Grapes do not appear to be sufficiently ripe, or of a different Kind from the rest, these ought to be left, that they may grow riper; and these must not be put but in the last Vat, or be mingled with the other Wine of a worse Quality: This cannot but render it the better, as well as the *Auvernat*, because it will be finer; for it will be the more

more worth in having a little the less, and not to be made with any thing but *Auvergnats*, and also those well-condition'd.

Because there are green Grapes that the Vintegars ought not to gather and mingle with the others; they should be expressly forbid to put into their Baskets, either those that are green or rotten, for the one would make the Wine eager, and the other give it a rotten Taste; which two Faults are equally to be avoided.

Of the Wines made in Orleans.

For a long Time, at *Paris* and other Places, there have been those who have endeavoured to decay the Wines of our Vineyard Plots, especially the Red Wines. In the mean time it is observable, that those who speak of them with the greatest Contempt, can't do without them, but procure them as they did formerly, either to put off their weak Wines, without Colour, or that have some other Faults, and also to preserve the finest, most delicate, and most celebrated.

For the Wines of *Burgandy* are no sooner brought in, than they mix them with our Wines, to drink them, so long as they last; and there is this to be said of our Wines, that there is not one single Wine-Merchant at *Paris*, who has not our Wines in his Vaults, not only for mixing with others, which are much meaner, but for selling without any Mixture: For tho' they have much Strength, yet, for all that, they don't fail to sell them pure, as well for their Tables as their Offices, to those that have the Curiosity to drink a Wine that is good, natural, and without Sophistication.

The Rapes which are yearly made, and the great Quantity of Wines, both Red and White, which they are so solicitous to purchase a long Time before they are made, in order to transport them from *Paris* into *Flanders*, *Holland* and *England*, and as far as the *American* Islands, where they drink good to the very last Drop, are, in my Opinion, sufficient Proofs, that our Wines are not so contemptible as they would represent them.

For it must be owned, that if they had not such good Qualities, or if they had any Fault, they would not come in Search of them so far, and would not take such Care to furnish themselves with them in time.

Some say, that our Wines being harsh, red, and too violent, they are not so agreeable to be drunk, and that those that drink them to any Excess, find themselves incommoded, which never happens to them when they drink the same Quantity, or even a greater, of the Wines of *Champaign* and *Burgandy*, and many other Vineyard Plots of the Kingdom.

I answer, that these pretended Faults are the real Qualities of our Wines, and those are what cause them to be sought so much after for this very Colour and Harshness (provided that it be not too much fermented in the Vat) for this serves to give a Quality to other Wines, that are weak, which would

never be vended to any Advantage without being mix'd with others.

Besides, if the Harshness of them, which they sometimes have, be their Fault, this is not always so, 'tis but accidental, and may be prevented, by letting them remain less Time in the Vat.

As for the Inconvenience that those are sensible of that drink too much of it, it is a very easy Thing for them to remedy that themselves; they need only drink less of it, and then it would not incommode them.

As for Example: *Aqua Vitæ* is not drank in so great a Quantity as Wine, nor a strong Wine as a weak one; when the Wine is very strong, they ought to drink Water with it, or drink less of it, then it would nourish a Person, instead of wearing his Body, or stupifying his Spirits. Thus, when one is sensible of any bad Effects from our Wines, it is not from their Quality that they proceed, but from their Quantity, which People know not how to use rightly.

If any of our Wines are undrinkable, this will not be always, but only for a Time; because, if these Wines which have so much Harshness, Colour, and Strength are not good to drink at one Time, it is certain they will be good at another, according to the Degree that they have been fermented in the Vat.

But this Fault is not in the Wine, since it needs nothing to be done to it, but to give it less of the Vat. It is also a great Advantage to our Vineyard Plot, that there they can make good Wine, fit to drink as soon as it is made, and which also will hold good many Months, nay, many Years after: Thus, when sometimes they ferment but a short Time some of our Wines, and leave others there to force, this contributes, I confess, to render them very Harsh; but this Harshness, instead of taking away their Quality, only suspends it, seeing that they become good after a certain Time.

Such are the Wines of *Gallinois*, of *Neuille a Bois*, of *Acheres*, &c. which do not become fit to drink till fifteen or eighteen Months after they have been made; yet they there make, off Hand, Wine that may be drank a Month or two after it has been tun'd; but then this Wine is not drank in its Perfection: For the best of the Wines of these Places are such as have been fermented in the Vat; in all likelihood, the Lands where these Vineyards are planted require it. That which I call fermenting in the Vat, is the letting them stand eight or ten Days therein, and sometimes more, but they must have as much Time as is necessary, to the end that their Harshness may go off.

It is true, we don't always buy Wine with Intent to keep it long; but it is as true, that sometimes we would have what will keep a long Time. The having much of the Vat then does not take away the Quality from these Sorts of Wines, since it only suspends it; as I said before.

Whatsoever ill-founded Prejudice may be taken up against the Wines of our Vineyard
9 C Plots,

Plots, it must nevertheless be allowed, that we have the Advantage over the greatest Part of other Wines; that we are able to make them such as we would have, and such as are demanded; that is to say, a delicate Wine fit for present drinking, red without being harsh, a little hard, and sometimes a great deal, and yet without losing its Quality; and thus we are able to make a Wine equally good to drink thro' the whole Course of the Year, and also for many Years after.

But, on the contrary, is it not a great Fault in certain Wines, in that they cannot be kept good for the Space of one Year? For one of these Tuns is spoilt before it is half empty; also the same Accident happens to it, when being quite full, the Heats surprize it before they have put it into the Vault, for these Wines don't spoil but when they are delicate, weak, and when they have been scarcely tun'd; and if they should be tun'd any more, they would become harsh, and entirely lose that little Quality they have in the Vat.

There are in this Kingdom many Vineyard-Plots, the Vines of which have this bad Quality; and yet these are the Wines that are so much boasted of, which will not keep the Year without spoiling, if they were not preserv'd by ours, which have more of the Quality than they.

But if those who put so great a Slight upon our Wines, should say we do not know how to make them, they would reason more justly than they do, when they would have us to believe that our Wines are not good; for they ought to allow that they are good in themselves; and we shall agree, that if there is any Fault in them, it is by Accident, since it only proceeds from the Manner of making it.

Then it must be said, that the Wines of Orleans are good; but that they make them ill: and then there is nothing more wanting, but to avoid the Faults in the Manner of making, and that is what I am going to treat of.

We have in this Plot of Vineyards so many different Sorts of Soils and Plants, that it would not be easy to give a Direction for the Manner of making the Wines from each of them: I can only say in the general, that in order to make good Wine, the Soil ought to be proper for the Vines, well expos'd to the Sun, on a gentle Declension from the North to the South, rather dry than moist, that the Plants set there be of a good Kind and well-chosen; that the Vineyard be rather old than young; never dung'd, or but very little, but rather earth'd, and always well wrought, and in the proper Times to work them; and that the Grapes have a certain Degree of Ripeness before they be cut; and that they be tun'd after they have been trodden, when one would make Wine that should have a Colour, and not for present drinking.

It is certain, that when all these Things concur, it will be easy to make good Wine: But there are yet other Things to be observ'd,

of which I shall speak in the following Part of this Article.

They make in this Plot of Vineyards, as well as in many others, both Red Wine and White. I shall speak first of the Red, and afterwards of the White, of which there are a few Things to be said.

The best and most precious Wines of all that are made in this Plot of Vineyards, is the *Auvernat*. Of this there are six Species, viz. the *Auvernat Teint*, the *Black*, the *Red*, the *Grey*, and two Kinds of *White*; which are the *White Auvernat* of *Solers*, and that of the *Low Country*.

The *Auvernat Teint* is the reddest, and as it has also the Quality, it gives the Colour and the Body to the other *Auvernats*, and prevents them from growing ropy; and when it is mingled with the Red only, they ought to let it remain in the Vat a little while, especially in those Years that there is Reason to believe the Wine will take as much Colour as they would that it should have, or where it grows on a Soil where the Wine has always been accus'tom'd to have Colour enough by being tun'd but a little.

Some pretend, that one Quart, or thereabouts, of the Wine [*de Teint*] of the Tincture, or of [*gros Noire*] the large Black, to a Vat of fifteen Puncheons of Red *Auvernat*, will have a good Effect.

I own that it will give it a fine Colour, without rendering it harsh, provided it be not tunned too long; but as this *Teint*, or this *gros Noire*, have no Quality but that of giving it the Colour, I am of the Opinion that the *Auvernat Teint*, which is very red, substantial and vinous, produces a better Effect: but it requires only to put more of that of the *Teint*, than of the *gros Noire*, because the *Auvernat* colours a great deal less than those two Kinds of Grapes.

The riper both the one and the other are, the more Wine they yield, and the more Colour they have; and for this Reason they ought never to be gathered, but when they are in their perfect Maturity.

The *Auvernat Teint* ought not to be planted indifferently in all Sorts of Lands, because it will not do well in all; and for this Reason, those who would have them, ought at first to plant but a few, to see if they will succeed in their Lands: Also Care must be taken not to mingle them with others in planting, that one may the better know what Quantity we should put into every Vat, which will be difficult to do, if they were planted confusedly with other *Auvernats* or red Plants, to make thence good mix'd Wine.

Altho' the *Auvernat Teint* is a very good Grape of itself, yet it must be owned, that if too much of it be put into the red *Auvernat*, it will alter the Quality of it; for the last Wine is never better than when it is made without any Mixture of other Grapes; and it has ordinarily as much Colour and Strength as it should have, not only to maintain itself by itself, but also to put off other Wines of a less Quality.

But

But then I suppose, that this red *Auvernat* grew upon good Lands; for there are some which of themselves do not give enough to the Wines that they produce: In this Case it is good to plant the *Auvernat Tient*.

It is true, that this Wine being mix'd, will not be so fine, as if it were only the pure red *Auvernat*; but then again, it will maintain it self better: And when one would make an *Auvernat*, which has a strong Tartness and a good Flavour, without having any Colour, you must put to the red *Auvernat* about the seventh Part of the *Melier*, or of good white *Auvernat*, such as now grows in the Vineyards of *Blois*: But that one may be able to make this Mixture, it is necessary that this *Melier*, or white *Auvernat* be ripe at the same Time as the red *Auvernat*.

A Wine made after this Manner, is so excellent, and so disguised, that it is made to pass for pure *Burgandy* Wine, and is sold at *Paris* and other Places as such in wicker'd Bottles: The best Wine-Conners are there deceived every Day.

The *Auvernat* without Distinction is red; they also name it from its Skin, which is brown, because its Colour is not of so deep a red as that of the *Auvernat Teint*, and because it is deeper than the *Grey Auvernat*, which is almost quite white, and that too when it has been tun'd very much. This Kind of red *Auvernats* is the most common among the black *Auvernats*, and one of the best Wines that grows in this Plot of Vineyards.

The [*Auvernat Noir*] *Black Auvernat* is very uncommon in this Country, and known by few Persons; its Berry is rounder than the other *Auvernats*; its Skin is as black as Jet, and that is the only thing that it is known by. There is also another Species of it, which some *Vignerons* call the *Auvernats* of *Touas*; it differs nothing from the Red, but in that its Wood is very big as well as its Fruit. The Grape is long and well fill'd; and it were to be wish'd, that this Kind was not so scarce in this Country, for it is the finest, and one of the best that we have.

The *Grey Auvernat* is neither white, nor black, nor red, but of a grey or pearly Colour when at the greatest Maturity. But some have made this Observation, that in certain Lands this Colour becomes black in about twelve or fifteen Years after the planting of these *Vines*; but nevertheless without losing their Quality. The Change of the Colour does not come universally. I have seen Vineyards very old, that did produce the *Auvernat* of this Quality.

This Grape having a very good Taste, makes also an excellent Wine, and, I am of Opinion, the best of all the *Auvernats*; but it is good to give it a little of the Green, especially when it grows in very good Lands, because this Wine having a very good Body, its Greenness falls by little and little, which at the same time augments its Strength; and it is the Green that they give it that sustains it, and hinders it from growing ropy; for these Wines that are not tun'd, or that are but a

little fermented, are very subject to be ropy, at least if the *Vines* do not grow in flinty Lands; nevertheless they are sometimes subject to be so in such Lands, but indeed not so much as the others.

When this *Grey Auvernat* has been made off-hand, or when it has been tunned but a very little while, and it is once gone from this Vineyard-Plot, and is denominated by a borrowed Name, it is an easy Matter to make it pass for such a Wine as is desired, whether it be sold as it is, or whether it be mingled with others of a higher Colour. But this Mixture must be made in such Manner, that the Quantity of the *Grey Auvernat* be not absorb'd by the Red that is mix'd with it.

It is not proper to let the Place be known, where a Wine, made after this Manner is gather'd; for if it were known that this Plot of Vineyards of *Orleans* produc'd it, there would need nothing more to make it lose all its Merit in the Opinions of those who suffer themselves so easily to be prejudiced against our Wines. When this Wine is made without any Mixture, then one perceives all the good Quality; and when it is cut with the *Auvernat Teint*, it is indeed less fine, but it keeps the longer, and is not so subject to grow ropy. And when the Red *Auvernat* is mingled with these two other Species of *Auvernat*, this makes one of the best Wines that can be drank, and it will keep without Harshness, because this *Grey Auvernat* has a Fund of Delicacy which allays the Harshness of the *Auvernat Teint*, and this by its Firmness sustains the other, and makes it keep the longer.

Many *Vignerons* do not know at all, and others feign that they do not know, the true *Grey Auvernat*; and the one from Malice, and the other thro' Ignorance, confound it with a certain Plant, which they call *Grey*, or the *Miller's Wife*; but this is a black *Formente* or *Bourguignon*, which is nothing of an *Auvernat*.

This Plant is one of the least that is in this Vineyard-Plot; yet many plant it, because it produces a great deal of Wine, and because it resists the Frosts of the Spring-time, and the other Accidents that happen to Vineyards, better than other *Auvernats*. And this is the Reason, one may say, that this Plant is a true Drudge, and it is without doubt for this Reason, that those who have it, always gather more Wine than others who have it not; but as the Quality of the Wine is not in this great Quantity, it is seldom that this Wine comes too good; for five or six Months after it has been made, it grows flat, tart, without Colour, and also is spoiled, by reason it is not put into a good Vault before the first Heats of the Spring of the Year, because oftentimes the first Clap of Thunder turns it. Nevertheless the Merchants furnish themselves with this Wine, because it is cheaper, and has a certain Headiness, which the *Auvernat* has not, unless it be two or three Months after it has been made.

In planting this wretched Plant we have found out the Secret of spoiling the best Places of

of this Vineyard-Plot; as for Example, About forty or fifty Years ago, the Wines of *Paroisse* and *Bou* were very much in Request; but since that Time almost all the Vineyards in this Territory have passed out of the Hands of the Citizens, and fall'n into those of the *Vignerons*, who commonly do not regard any thing so much as the Quantity, and therefore have indiscreetly planted so many Vines of this black *Formente*, that now the Wines of this Place are much neglected, and sought for elsewhere.

But nevertheless we are not to believe that our Soil has changed its Nature, as some Persons falsely imagine: without doubt it is still the same; and to render this that I say the more certain, if we taste the Wines of those who have nothing but the pure *Auvernat* in their Vineyards, I am sure we shall find them as good as the best *Auvernats* of this Vineyard-Plot.

If the greatest Part of the Wines of this Place are not so good as they ought to be, it should not be attributed to the Ground, which cannot change, but to the bad Plants that have been planted there: and it is to be feared, that in Process of Time the same Inconvenience may happen to other Places, whose Wines have at this Time a great Reputation, because they have effectually a good Quality; and they will keep it, as long as the Citizens shall not have the Itch of planting the wretched black *Formente*.

It may be said, that many Commissioners and Wine-Merchants have given occasion to those who destroy or renew their Vineyards, to plant there the black *Formente*, because they would not always acknowledge the different Quality of Wines by the Difference of the Price.

This, I say, has been the Reason that determined the Citizens, as well as the *Vignerons*, to regard the Quantity more than the Quality of the Wines. But they are much to be blam'd for this, because they thereby depreciate their Estates; for they must needs know, that in those Years when there is Abundance of Wines, as frequently is the Case, a Search is always made after those that are best; and so the Wines which are found to have the Quality are sold, and those that have it not are left in their Hands.

Of making Wine in Orleans.

The Grapes being cut and carried from the Vineyard to the Press, they tread them either in a Scuttle, which they place there, or in a Vat when the gathering of the Vintage is finished; or, in fine, they cast them into a Trough of a Wine-Press to be bruised. Also sometimes they carry them directly to the Press; but this is when they would make Wine fit for present drinking, and that it is not fermented in the Vat at all.

Those who make use of a Scuttle to bruise their Grapes, can't possibly tread the Grapes well, or at least they will be a long Time in

doing it, and have a great deal more Trouble, in that they are obliged to raise up with all their Strength, the Puncheons that they tread, to cast them into the Vat with the Marc, in order to work it all together.

The Manner of bruising the Grapes in the Vat when it is fill'd, is much worse than the first; in that notwithstanding all the Precaution that can be taken, and whatever Time is allow'd to endeavour to do this Work well, it is absolutely impossible it should succeed well; for when the Wine has been tun'd as much as it ought, and they have put it on the Press with its Marc, there will be a Part of the Grapes that have not been half bruised, and this causes the Marc to yield less Wine, and there is not all the Colour that it might have, and therefore the Grapes ought never to be bruised this way when it can be done otherwise.

But if this is a Loss to the Citizens, not to draw from the Marc all the Wine which it ought to yield, if all the Grapes had been well bruised; yet it affords an Advantage to the *Vignerons*, in that his Drink will be so much the better.

As there is an Inconvenience in trading the Grapes, either in a Scuttle or a Vat, as I shall make appear, it will be better to make use of a Trough for a Wine-Press; this is, without Contradiction, the best way to bruise the Grapes.

And besides, a Wine-Press Trough will serve for four Panners, when the other will not serve for two, if they make use of a Scuttle; for according to the Measure that the Grapes are bruised in the Wine-Press Trough, the Wine falling into the Vat does not rise above the Grape, by which it may be more easily known whether the Grapes have been well or ill trod before the Marc is turned into the Vat; or it is a great deal more easy to push it with the Foot, when the Trap-Door of this Trough is lifted up, than to lift it up thence with bodily Strength, as they are obliged to do, when they tread in a Scuttle.

This Trough ought to be set in a kind of Litter, and placed upon or over the Vat; but when the Covering of the Structure where the Press is, is low, it must be plac'd over the Middle of the Press without a Litter; then there will be a little more Trouble, because it must be emptied into the Vat with a *Bucket* or Scuttle; but this is no great Matter, there are Hands enough to do this Work.

The Grapes having been trodden, as before, the Marc may be thrown into the Vat, either with the Grape and Skins, or separated the one from the other: This depends on the Manner after which one would make the Wine.

When the Grape is tun'd with the Skins and the Wine, it may produce two different Effects, the one of which will be good, and the other bad.

When it has been tun'd a considerable Time the Wine is less green, less subject to be ropy, and

and better for keeping, than if it were done off-hand, or fit for present drinking.

But if the Grape be tann'd too much, it takes from it much of its Quality, because it leaves a Harshness, which renders it not fit for drinking for above a Year in certain Lands, and in others it never loses the Taste of the Grape-Stone; and when with this Excess of the Vat it has a Colour as red as Ox Blood, it is a Wine which they call *Grossier* or *Matin*; and it is commonly said it is better to keep than to drink.

When a Wine has this Fault, one cannot render it drinkable, but by mingling it with good dry new White-Wine.

Then it is this Excess of the Vat that renders our Wines hard, and makes them disesteem'd without any Distinction, altho' all our Wines are not made after this Manner. But it is an easy Matter to avoid this Fault, which renders our Wines contemptible.

Those who run the Grape-Stone with the Skin, and would give to their Wine only that Degree of the Vat, which it ought to have, not to be strong, do draw it out from time to time by a Pipe, or by some little Hole which they make in the Vat; but this I do not approve of, for Reasons to be given in the following Article.

Others make use of a Vine-prop, or some other Piece of Wood, which they thrust into the Vat, from whence they draw it out quick, and let it drop into a Glass, where they examine if it have Colour enough, and if it makes a Circle of Scum, and boils and bubbles, which they call *faire la rouë*: Others watch till the Marc is risen to such an Height, and make a Judgment by that.

As for my self, I am of the Opinion, that it would be a surer Way to thrust one's Hand a pretty Way into the Vat, (which I suppose to be rais'd and to have been work'd) to take from thence a Handful of the Marc, and to put it to one's Nose, as the Diers do, to judge of the Disposition of their Vats; then one may know if the Wine be made, and if it has Colour enough.

When it smells sweet, you should let it work a little longer in the Vat until it has lost that Smell, and has a strong Scent that affects the Nose: then it ought to be taken; for one Quarter of an Hour at most is sufficient to force it.

A Wine taken in its proper Degree of the Vat will never taste of the Grape-stone, it will be always fit to drink, and also will keep good for many Years.

I agree also, that the Wine that has been tann'd too much, becomes tart and harsh, and that that is what takes away its Quality; and as it is the Grape-stone and not the Skin that causes this Tartness and Harshness, the Means to prevent this Inconvenience, is, in being very careful as to the Degree of the Vat that is given to the Wine.

But as one may often be deceiv'd in giving it too much or too little of the Vat, I think the surest Way would be, to stone the Grapes when they are trampled, before they are put into the Vat.

This Work would not be so much Trouble as it may be imagin'd, for one Stoner would suffice to employ one Treader, let him tread as fast as he can.

When the Grapes are bruised in a Wine-press Trough, several may employ themselves in stoning: One Method of doing it is, to put them into a Basket plated, &c. about six Feet long, four Feet broad, and ten or twelve Inches high: And that this may not be any Incumbrance, it may be plac'd about the Middle of the Press, and have two Men to sift and separate the Skins from the Grape-stones.

I find that a Cribble is much more convenient, for it takes up less Room, and there needs but one Man to work above, and the Work will be as easily or more easily done.

I have seen many of these Cribbles; but that which I am going to describe, appears to me to be the most commodious.

The Cribble for stoning the Grapes ought to be made with Brass-wire, because that is more pliant, and does not rust so much, and lasts longer than Iron-wire. The Holes ought to be an Inch in Breadth, almost of an octagonal Figure; is is work'd upon two Hoops join'd together, the one upon the other: and when it is finish'd, it is to be cover'd with a third Hoop or Band, that is about four Inches high.

As the Marc is in falling, and the Wine being pressed out, and that it is cast in the Height of the Cribble, they put under it to sustain it, a Band of Wood or little Hoop two or three Fingers high, which goes round at the Bottom of the Cribble, and besides this, four Iron Bars of the Thickness of a little Finger, because if they were broad, the Skins of the Grapes would rest there, which would hinder the other from passing.

It is proper to put these Iron Bars in such a manner, that two of the four may sustain the other two, and that they be all of the same Length.

The Ends ought to cross the two Hoops, and to cover the third, and they must be join'd to many Places of the Trellis with a Brass Wire, which may be double or treble.

The Wood of the Hoop ought to be notch'd in two Places over against one another, and about an Inch in Depth, and three in Breadth, according to that of the Staves upon which it is to be plac'd; and these Staves should be plac'd upon a Scuttle resting upon the Vat, above which they tread the Grapes.

It is also proper that these Notches be plated with Iron, and that they have two Handles or Grasps of Iron pretty thick and round, to prevent the hurting the Hands of him that manages the Cribble, because it is weighty, and there is Occasion to remove it from Place to Place.

This Cribble may be about a Foot in Height, eight or nine in Circumference, and an Inch in Thickness at the Top, and something more at the Bottom, because of a Band of Wood that is plac'd round about to sustain the Trellis, as I have said before.

The Treader having bruised the Grapes, instead of pushing the Mass in the Vat with his Foot, as is done when he would tun the Grapes with the Skin, it is taken either with a Bowl or a Pail, or with the Hand, and put into the Cribble; then the Stoner separates the Marc, as well as he can, the Skin from the Stone, and casts the latter into a Vessel that stands near him: and when that is fill'd with the Grapes, they carry it to the Middle of the Press in a Pail, or in a Basket, and from time to time empty into the Vat (to which the Stoner is very near) the Skins and the Wine which are in the Vessel above, which has been stoned.

The Business of the Vintage-Gatherers being finish'd, they put the Marc and all the Stones that are upon the Middle, and they lower the Plank to draw from thence the Wine that is found there.

Some give it another Bruising, but I believe very unprofitably; for that can't get out much Wine; and also that which they get from these Stones has nothing but a Harshness; but nevertheless one may, because there is a little of it, mingle it with the other, that is in the Vat.

One Marc of Grapes, which one may reckon ten *Poinçons*, may yield about fifty Pints of Wine or thereabouts. This depends upon the Size of the Grapes, and the Heat which has been during the Time of the Vintage-gathering.

The Wine being boil'd with its Skin, it will be necessary to observe, from time to time, if it have Colour enough; and if it be sufficiently made, to be taken off: and when it is found that it is not yet red enough, the Marc must be thrust down in the Vat in order to give it the Colour, and never to be forc'd: You may also cover the Vat with a coarse Linen Cloth double, and put the Board of the Press upon that, in case one is apprehensive that it will lose a Part of its Strength.

It is not the same, when the Stone is left to tun with the Wine, because it can easily force; whereas this Inconvenience never happens when the Grapes have been ston'd: For this Reason it ought always to be done; one is sure to have Wine well made, and such as may be kept many Years without spoiling, according to the time that it has been left to ferment.

And if all our Red Wines were made in this manner, we should not have occasion to say, as it hath been said for a long time, that our Wines are harsh and coarse; for it must be agreed, that it is nothing but the Stone that gives it this bad Quality, which is, however, accidental, since I have offer'd a Method to remedy it, which may easily be put in Practice.

Many Citizens complain, that the Merchants won't give a greater Price for the Wine whose Grapes have been ston'd, than for that which has not; but, in the mean time, it is better: It does, indeed, cost something more in making it after this manner, in that it takes up more Time in pressing.

Upon this Account many Citizens have

discontinu'd the stoning their Grapes; but I do not approve of that: we ought to spare nothing to make good Wine; and I am persuaded that there will always be found Merchants reasonable enough not only to make a Distinction between a Wine, the Grapes of which have been ston'd, and that which has not, not only by their Taste, but in the Price too.

As the Grapes that are fermented without their Stones, is subject to grow ropy, it is good to prevent this Inconvenience in gathering them before they come to their full Maturity, and to give them but little Fermentation; it can then never be too thick, because the Grape-stone not being there, it is impossible it should force it.

During the Time that the Wine is working in the Vat, one may pierce the Casks, and put into each of them about a Pint of Water; it should be boiling hot, or at least very hot: This will purify the Vessels, and render them more tight.

The Hole of the Bung being well stopp'd as soon as the Hot Water has been put in, it should be shaken and turn'd on all Sides, to be able to see if it has Vent in any Place.

Some pretend that this hot Water will take away the Taste of the Casks; but I very much doubt of this.

In order to make this Experiment, it is requisite that one be first sure that the Cask has any bad Taste.

When the Casks have been season'd and drain'd as dry as may be, they must be plac'd upon the Stilliers, and there set firm with Stones or some other Thing, to hinder them from rolling while they are filling.

The Basket that is hung up by Means of a Prop to receive and hold the Grapes and Skins which fall from the Middle of the Press into the Wooden Pipe, ought to be well clos'd up to hinder the Stones from going into the Casks when they are filling, because when the Wine boils, it casts out the Scum, the Lee, the Skins and the Stones, in order to purify it self, and sometimes a small Quantity of these is sufficient to stop intirely the Holes of the Casks.

But to prevent this Accident, one may nail, at the small Hole at which the Wine runs down, a small Lattice of Brass Wire, of which the Holes must be very fine: then there would but a few of the Skins pass, and no Stones, and the Basket, which is very troublesome when one would empty the Pipe, would be useless.

One may yet, for the greater Security, have another Grate, and fasten it with Nails above the Socket on the Inside of the Funnel; but this Grate must be rais'd three or four Fingers, to the End that the Skins may not hinder the Wine from passing.

Before the Marc is begun to be put upon the Middle of the Press, I suppose the Press to be in such Condition that nothing is wanting of all the Utensils that are necessary; for it would be an Imprudence to have at this very Moment any wanting that is necessary for the making of a Marc.

It is true, one may borrow of a Neighbour what one may want, but it may so happen that they may be using the Things at the same time, and that would be a great Disappointment.

The Screw being the most brittle and most necessary Part belonging to a Press, a Master ought always to have one in reserve, ready to be put in, in Case of Need.

In like manner, the Feet of the Beams should be examin'd some time before the Vintage, that they be not rotten, for that is the Place they commonly fail in; and when this happens, it is not so easy to remedy it as it is to remedy a broken Screw.

In order to make the Beams of a Press last a long time, when they are good of themselves, it ought to be so contriv'd that they may always have the Air under the Middle of the Press, especially at the End of these Pieces there ought not to be either any Marc or Earth, and therefore it should be hindred from falling there.

Some make a small Piece of Brick-work round each of these Beams, and that is the best Precaution that can be taken to make them last a long time.

After the Press has been put in Order, and that the Wine has had its Degree or Time in the Vat, that it ought to have, or they can give it, it must be put upon the Middle of the Press.

When it is at a great Distance from the Vat, they make use of a Scuttle or Basket, or if it be near, of a Pail: which they let drain upon a Board which bears at one End upon the Vat, where it is fasten'd with a Nail or other Thing, and the other upon the Middle of the Press: This Board should be border'd on both Sides with Ledges, strait and well join'd, and about an Inch in Height, to hinder what drains out of the Basket from running on the Ground.

A Piece of Wood, with a Hollow or Channel about an Inch deep, would be much better than this Board with Ledges, for they can't be with Ease so closely join'd but that the Wine will find some Chinks to run out at, which will not be in this Wood thus hollow'd.

Some, in order to empty their Vats the more easily, put in a Pipe, through which they draw the Wine clear through a little Buckingtub made for this Purpose; out of which they take the Wine in a Pail or Pannier, to empty it into the Casks.

For this Purpose the Vat must be set high on a Stilling or Gauntry, and the Earth hollow'd at the Place where the Pipe is plac'd.

Before the Wine is drawn off clear, you must always begin to take off the Cover of the Vat, in order to prevent the Wine from forcing; and this must be done in such a manner, that he who empties has not the Trouble of lifting it up so high to put it in the Scuttle or the Measure.

I own, that this Manner of emptying a Vat is very commodious; I shall, in the following Article, speak of the Inconveniency that may happen thence.

The Marc being plac'd on the Middle of the Press, they cover it with a Board, with Bolsters, Cushions and Bags or Pillows: There must be two Rows of these last, and sometimes three, when the Marc is thin, because by how much less the Screw appears, by so much less is it in danger of breaking; and as the Marc shall be thick, according as they have order'd it, there must be some Rows of the Bags retrench'd; for it is sufficient that there is a certain Distance between the Wheel and the Screw, which would not be so if the Marc were very thick, or there were many Sacks.

There is no need to put the Ring of the Rope into the Hook before the Wheel has been lower'd on the Bags, and that you have examin'd if all is made even, and that none of the Bags are remov'd.

Before you begin to lower the Wheel upon the Bags, the Screw ought to be well greas'd above the Nut of it, and also below, when it touches the Bags.

They also grease that Part of the Screw that was within the Nut-screw before they have brought it down to the Point where it ought to be; for the first Operation after the Plank of the Axle-tree has been let down, and before the loosening, the Screw must be soap'd on the Places where it has had none.

White dry Soap, without Oil, is the best for greasing the Screw: When Oil is mingled with the Soap that draws the Rats, who gnaw the Screw, and it occasions a Gum or thick Substance, which makes it go hard when they press the Marc.

The Trendle ought also to be plac'd at a reasonable Distance from the Middle of the Press upon the Nave of the Wheel; and being well rubb'd with Hog's Lard, the Trendle will turn the better: Others make use of an Iron Crow, which at least produces as good an Effect as the Nave.

When the Staves or Rammers are rather long than short, and that the Trendle is picr'd with an Height agreeable to a Man of a middle Stature, they will have the more Force to press the Marc.

After the Plank has been let down, and the Troughs fill'd to a Pannier, or thereabouts, and they have afterwards added the Wine that comes from these Pressings, they give the first Squeezing, which ought to be follow'd by three others in a short time, because the *Auvernat* having in it much Fire, its Marc would dry quickly, and yield much less Wine, if there were much Time between these Pressings.

It is not enough to grease the Screw of the Press the first Operation before the Balance is let down, when it is a Wheel-press; it ought to be done from time to time, especially when the Screw is perceiv'd to be rough, or squeaks in the Nut when the Trendle is turn'd.

Some, before they give the Marc the last Operation, *barbager*; that is to say, they work it, or prick it with an Instrument of Iron, but without touching the Sides, because they chuse to hinder it from falling on the Middle.

Middle. They pretend that this little Squeezing makes the Marc yield about two Pints of Wine the Puncheon.

I have never made the Experiment; but this is seldom practis'd but in the Marcs of White Wine, because they are thicker, and not so hot by much as those of *Auvernat*.

The last Operation or Pressing being given, you may wait twelve or fifteen Hours for raising the Marc, that it may have Time to drain; and they seldom raise it sooner, except they want the Press for making other Wine.

Altho' the Wine that comes out of one Vat is the same, yet they give it two different Names: The one they call *Unpress'd Wine*, and the other the *Wine of the Press*.

The first is that which comes from the red or white Grapes, when they have been trod, whether they have been tann'd or not; and the second is that which comes from the Marc after the Pressing. As this last has always a great deal more Colour and Harshness than the first, they mingle them together, to the end that they may make an equal Wine; and if they do not do this, they would have one Part of the Wine of the same Vat too delicate and weak in Colour, and the other too red and too harsh, which would not be fit for the Merchants, who are for an equal Wine.

When I say the Wine should be equal, I mean only that of one Vat, and not of one whole Cellar; for as all the Wine that one buys can't be all spent at the same time, and that the Merchants search sometimes for Wine high colour'd and a little firm; and sometimes for a Wine more delicate and fit for present drinking, therefore it is, in my Opinion, the Prudence of a Citizen to have Tuns of different Degrees of Colour and Firmness, that the more delicate may be drank first, and the firmest some time after, or the Year following, for most Persons love old Wine better than new.

But it is yet more advantageous for a Citizen to have Wine that is rather a little firm than too delicate, because if that be not sold quickly, it may grow ropy or be spoiled; when, on the other hand, that which is well mix'd will keep a great while, and he may sell it a long time after.

It is true, the Merchants often slight, or rather seem to slight and reject a Wine that has been but little fermented; but it is very often nothing but a little Chicane that those make use of who are employ'd to purchase Wines, to buy them the cheaper; therefore we must give them Leave to say what they will; but always give the Wine something of the Tun, because if it be not sold at first, it will at last: whereas when it is made for present drinking, it must be sold as soon as may be, and perhaps under Price.

Some Person out of Thriftiness, or rather fordid Covetousness, fearing to lose a little Wine, never intirely fill their Casks till the Wine has cast forth its greatest Fire, that is, they won't make it boil till it has no Force left; and there being only one Pannier full of Wine put into the Cask the next Day, or two

Days after it has been fill'd, that has not the Force to warm it again sufficiently to make it boil.

This Way of managing of Wine is very wrong, for it causes all its Excrement to remain at the Bottom of the Cask, which augments the Lee, and often contributes to the spoiling the Wine, and to keep it for a long time foul, which therefore the Merchants reject.

It would be much better to fill it presently up to the Bung with the Pressurage, or with what has been press'd, which is taken from the Pressings that they give to the Marc, because the Casks being always full, the Wine purifies it self the more, and becomes clear in less time, and of consequence is more palatable, and may be sold sooner.

It is not enough to fill the Casks up to the Bung the first time that the Wine is put into them; they ought to be fill'd many times; that is to say, as soon as the Boiling is over, Wine must be put in to excite it to boil; and the same thing is to be done the next Day, and afterwards for eight or ten Days every other Day.

The Necessity there is of filling the Casks as soon as the new Wine has been put into them, is proved by the Accident that happen'd to the Wines in the Year 1718, when the Season was too hot and too dry during the Months of *July* and *August*.

The Wines were then so extreme hot as to boil very low in the Casks, so that many, who had neglected to fill them at first up to the Bung, had their Wine turn'd sour; which did not happen to those who had used the Precaution of filling them to the Bung, and keeping them full: and for this Reason, those who have many Tuns of Wine, ought always to take of the last they have made to fill all those Puncheons of the other Tuns; and when a Person has but one, he must put of Wine in a Cask call'd a *Gueulebée*, to fill those Puncheons as far as to the Bung, as soon as the Wine has done boiling; then the Wine that remains must be put into the Casks or *Gueulebée*, or into a very close Vessel, for fear of its evaporating or losing its Spirit.

I will say, by the bye, that many deceive themselves in making Wine these hot Years; for they let it ferment but a little, because it boils as soon as it is trod; but this is but a false Boiling, which comes rather from the Fire that is in the Grape, than from the working in the Tun; therefore it ought to be tann'd a considerable Time. It is in such Years the Grapes should be rather be stoned, and that the Wine should be sufficiently fermented.

It is true, there is some Inconvenience in filling the Casks up to the Bung the first Time the Wine is put in, because it is impossible not to lose some of it, for it will mix with the Scum and the Lee which comes out at the Bung; but this Inconvenience may be remedied, by setting Gutters above the Bung, and Pans or Vessels of Wood under the Gutters, to receive all that which comes out.

And

And whereas some pretend that Lead communicates an ill Taste to the Wine, it is the surest Way to have them of Tin, in such manner, that nothing but the End of the Socket may enter into the Hole of the Bung; for if the Hole be made larger than that the Socket may play within it, the Gutter will be useless, because the Wine would run out between the Wood and the Socket.

There must also be a Vessel call'd *Gueulebée*, to empty these Vessels in as they fill, and it should be cover'd with a thick double Linen Cloth, and clos'd or fasten'd all round about with a Hoop to hinder the Wine from growing flat.

The Lee descends by little and little to the Bottom of the Casks, where it is join'd with the Scum, which there falls together, and is incorporated with it.

Some Days after, the Wine being grown clear, they take away the Vessel, and the Lee remains at the Bottom. This Wine may be put in a Vessel by itself, without mingling with the Wine which is in the Casks out of which it came. Some say this collected Wine is the more fine and strong; but others say to the contrary: They may say what they will, but it is always true, that this Wine is very good, provided it has been kept very close in the Vessel where it was collected.

And I believe that one might, without any Scruple, make use of it for filling the Wine: But as to this, you need not consult either the Merchants of the *Vignerons*; since the one have not Judgment or Sincerity enough, and the other are too much interested: And I speak with a Knowledge of the Matter, founded on the Experience I have had many times, and without any Interest but that of the Publick.

Those who from a covetous Temper will not be at the Charge of procuring these Gutters and Vessels to receive the Wine of the Casks while they are boiling, have no Skill in it: For the Wine which they would save by this Means, would make a-mends intirely the first Year for the Expençe they would be at in procuring them.

Others, that are afraid that they shall not sell their Wine, say, that the Merchants have always an Opinion in Favour of that Wine, of which the two Sides of the Bung of each Cask are fill'd with Scum as far as the first Bands or Circles; and that they have a quite contrary Opinion of those where it does not appear.

It is true, that formerly they did mind this, and their Opinion might be well grounded, because they never made use of these Gutters: But at this time their Opinion is alter'd; for they are perswaded, that these Gutters being in use, a Cask may have cast out all the Scum without its appearing at the Sides of the Bung, because it falls into these Vessels that are set to receive it; and likewise, that all the Wine that is there is well mingled.

Besides, it is an easy Matter for a Merchant to know if there be much Lee in the Cask, for he needs only to pierce it into the Lee, that is to say, at the Bottom, about two Fingers

of the Notch of the Cask where the Head-pieces come in.

The Wine having cast out all its Scum, it will be proper to taste all the Casks into which it has been put, to the end, that if any one be found that has a bad Relish, to apprize those of it who have furnish'd them, that he may put all the bad ones to his own Account.

Some say, that *St. Martin's-day* being pass'd, you can't oblige the Merchants, who have furnish'd the Wine, to take that again which has been spoil'd in the Casks, because they say it is the more difficult to remedy it: Others pretend, that the Merchants are answerable three Months after the Casks have been fill'd, provided they have not been remov'd from off the Stillings.

When the Wine has done boiling, it must be cover'd with the largest Side of the Bung, to hinder it from evaporating; and eight or ten Days afterwards, it must be fill'd full, and bung'd up.

Some make use of Bungs about half a Foot long, because they can take them away without daubing the Casks with the Scum. But I am of the Opinion, that broad Bungs are better, and to make two Holes on the Side, the one about the Bigness of a little Fossit, the other about the Bigness of ones little Finger, that a Tin Funnel may be put in, having in it a Piece of Tin folder'd about two Inches from the End; the Holes of which may be as big again as those of a Tobacco-Grater, to the end that when one uses it to fill the Casks, neither Stone, nor Skin, nor Kernels, nor Lee may pass: The great Hole serves for the putting in of a Funnel, and the other to give Vent for the Casks during the Time the Wine is poured in them.

This little Hole ought to be made at the Time that the Casks are bored, to put in the Wine with the great wooden Funnel; for if the Socket does exactly fill the Bung-hole, the Cask would fill but very slowly, if it had not Vent given it by the little Hole.

When it is done after this manner, the Tuns are not daubed with the Scum; it is not disturb'd, as is done in striking to beat in the Bung, and the Wine will have less Vent.

You must be sure to fill the Wine every fifteen Days after it has been bung'd, until towards *St. Andrew's-Day*; you are not to meddle with it any longer till after the Severity of the Winter is over, which commonly happens towards the Middle of *February*, because the Frost may make it swell.

The *Auvernat* is not the only Red Wine that we have in this Vineyard Plot, there are also other Wines made that have the same Colour, but are of a different Quality.

There is, for Example, the *Bon Lignage*, or the *Good Wine*, and that which is made of all Sorts of Grapes. As to the first, it is made up of the Red *Auvernat*, the Teint, the Grey, the White, the tender *Samoireau*, the *Melier*, and all the best Sorts of Red Grapes.

The second is compos'd of all Sorts of Grapes good and bad, but more of the latter than the

former; whence it is easy to be comprehended, why the one has less of the Quality than the other; and as this second is generally spent in the Country, they make it all manner of Ways, either fit for present drinking, or firm, or hard, according to the Occasion they have for it, and the Quantity they are to provide. As to the other, they don't fail to make it, and often send it to *Paris*.

All these Sorts of Grapes are not gather'd with the same Care as the Red *Auvernat*, which cannot bear the Water, nevertheless the Wine is the better, when the Grapes with which it is made are cut in a Season that is rather hot and dry than cold and moist.

We have in some Places of this Vineyard-Plot three Sorts of Red Wines which bear the same Name, which nevertheless they distinguish the one from the other: There is the tender *Samoireau*, the hard, and the *Fourchu*, which have all three different Qualities.

The tender *Samoireau* does very well in the Lands of the *Olivet*, *St. Mesmin* and *Clery*, where it is more plentiful than any where else. They make of it a particular Wine which will keep a long time, provided it have no Mixture, and that they give it but little of the Vat; this renders it firm, and prevents it from growing ropy.

This Grape may be mingled with the Red *Auvernat*, because they both ripen at the same time. The *Samoireau* gives the Colour to the *Auvernat*, it sustains it, and causes it to keep a long time; but you must put but a small Quantity for fear of altering or entirely absorbing the Quality of the *Auvernat*, which after it has lost, it also loses his Name, and is no more regarded but as a good *Vin de Lignage*, or one compos'd of all Sorts of Grapes, which is vulgarly call'd *Vigneux Auvernat*, very different from that of the Citizens, which is in a manner pure *Auvernat*. When one would render this *Vin de Lignage* yet better, he may put to it a fourth Part of good *Melior*.

The hard *Samoireau* is a little higher colour'd than the tender; when it has but its proper Degree of the Vat, they may mix one or two Puncheons of White, and a little less, when they run it; they should also, when it may be done, take a *Melior* of a better Kind, for this Wine has not much Fire. When it is pure, and it has pass'd the Year, that Quality diminisheth; it is then proper to make use of Rapes, not of Chips or Shavings, but of Corn, without putting Grapes to it, as some do, for that renders it hard and disagreeable to drink.

It is sufficient to put a third Part, or at most a half of the Seeds into a Punccheon; and after that they fill the Wine up to the Bung. They make use of these Rapes to put off the Grounds or Bottoms of Wine, and the weak Wines, which they also mingle sometimes with them; the third Kind of *Samoireau*, of which I shall speak, renders them the better for keeping.

The *Samoireau Fourchu* is the best of the three Kinds; this is proper to give the Colour to the others, and to sustain those that are weak, and to restore those that have any Defect.

In order to know the Colour, they cast some of it against a Wall; and according to the Impression it makes, they judge of the Effect it will produce.

One single Punccheon of that will colour six of White, and sometimes more, according as the Seasons are hot, and the Quantity of the Wine that the Vineyard has yielded: This Wine is not only good to drink, when it is taken in time, but it serves for a Remedy against the Dysentery and other Maladies. Its Marc is good against Rheumatisms.

This Plant has a Virtue that is not found in any others, because the longer it is kept the better it is: For it is better for drinking at the End of twelve or fourteen Years, than one or two Years after it has been made.

Some put it in Bottles, but it keeps equally as well in Casks, provided Care be taken to keep them always full, and to observe that the Casks don't want Hoops; and it will be proper to put on several Iron Hoops at each End.

The Wine, the Marc, and the Wood, or rather the Ashes of this Plant, have also a great many other Properties, which I shall not relate.

The Time of gathering these two Species of *Samoireau* comes much later than that of the first; that ripens at the same Time with the *Auvernat*.

The Territory of *Mardic* is the most proper for these Plants, and that which produces the most of it, (I mean of the hard and *fourchu Samoireau*); there is of it at *Bou* and *Cbeci*, and but a very little in any other Places of this Vineyard Plot.

As the *Fourchu* never produces more Wine than when it is a little old, many, eager to enjoy the Fruit of their Labours and their Expences, have not Patience to wait so long, and therefore they pull up those of them they have, and can't resolve to plant them when they have them not.

Nevertheless this is a precious Plant, and one may judge of it by the Effects that it produces, and by the Price which it bears, for it is commonly sold for double the Price of the best Wines of this Country: And I don't know but that those who destroy them, and those that don't raise them, will repent it one time or other.

As there is not much to be said of the Manner of making white Wine, and having taken Notice of at the Beginning of this Article, I shall say but little of it particularly.

Although there are many Kinds of white Grapes, yet they make, as one may say, but two Sorts of Wine of them; the one is the moist, the other is dry Wine.

The first, such as the *Muscat*, or the *Gendin* of *St. Mesmin*, those of *Marigny*, of *Rebrecbein*, and other neighbouring Places, may be look'd upon as the most precious, in that they bring the Money into the Kingdom, rather than the dry Wines; for they send them into *Holland*, *Flanders*, *England*, &c. To render this Wine the better, they don't content themselves to see that the Grapes have their perfect Maturity,

Maturity, and be half rotten ; they wait oftentimes 'till the Frost has taken them, to have the Wine which they call *Bourru*, and in some Years they defer the Vintage until the 15th or 20th of *November*, and it is then sometimes so cold that the Icicles hang upon those Grapes that perished, so that they are obliged to carry Fires into the Vineyards in great Pans, to warm the Gatherers.

It is true, that those who tarry so long before they gather, have a great deal less Wine than others, but then at the same Time it is much better, and sells a great deal dearer ; so that I believe it comes much to the same, or very near the Matter.

The Wines of which I am speaking, altho' sweet of themselves, they have nevertheless not always the same Degree of Liquor ; this depends upon the Condition of the Season, that is to say, by how much the *Summer* and *Autumn* is the hotter, the Wine has the more Liquor, and it has a great deal less when the Season is the contrary.

What I say is so true, that the Season having been very hot in the Year 1719, the sweet Wines themselves had abundance more Liquor than ordinary, and kept good more than a Year ; also the dry Wines of many Places were sweet and clear.

Some Red Wines were also very soft, (which is very rare) and held good 'till the Month of *February* in the Year 1721. It is true, they were thick, and that they did not become clear 'till the Time that they lost their Sweetness, which altered their Strength.

The Softness of the white Wines being over, they were nevertheless good ; but as there remains a certain Flavour, which pleases the Palate of most Persons, it is best to sell them, and spend them as soon as may be.

One may know by Experience, that good Grapes almost always make good Wine. Among the white Grapes, without Contradiction, the best are the *Melior* and the white *Auvernat* of the *Low Countries* ; as the white *Formentis* or *Bourguignons*, the *Maledeneaux*, the *Framboises*, the white *Gois*, &c. make a Wine which is better to throw away than to drink ; yet Vineyards of the *Vignerons* are stult with these wretched *Vines*, because they yield more Wine, and for the most Part, better resist those Accidents that happen to a Vineyard ; for these People have no Regard to any thing but the Quantity, which is the Reason that they do not ordinarily sell their Wines to that Advantage as the Citizens do.

The white Grapes cannot be gathered too ripe, because the riper they are, the more Wine they produce, and their Rottenness does not give it any bad Taste ; but when it is begun before they come to their full Ripeness, they are subject to grow yellow ; yet Regard is to be had to those Lands of which the Wine is subject to grow ropy.

For this Reason, when they are gathered, it is good that the Grape has a little Greenness, to the End that the Wine that comes from them may be able to keep dry, to which the white *Auvernat* of the *Low Countries*, and

the green *Melior* contribute very much ; the last hinders the Wine from being ropy, and the first makes it clear ; and for this Reason it is good to plant of it with the *Melior*, because at the Time of Gathering they may be both mingled together, and make a Wine without any Fault.

One ought to endeavour not to gather the white but when the Weather is fair ; a rainy Season is not so favourable ; for one ought never to mingle Water with the Wine that one makes, tho' some are not over scrupulous as to this Point ; it is true, the Inconvenience is not so great in respect to the *Auvernats* ; but that should not hinder one from always endeavouring to make good Wine ; and for this Reason it is best to gather the Vintage in a dry, hot Time.

As the white Wine is not tann'd, when they bring the Grapes in Panniers from the Vineyards, they empty them directly on the Middle of the Press, where they trample them with their wooden Shoes ; the broadest and smoothest are the most proper for this work.

The Grapes ought to be trod immediately, that is to say, every Pannier as they bring them from the Vineyard, otherwise the Wine would be yellow, and this Colour is disagreeable to the Sight, and still more to the Palate, and consequently gives the Wine a bad Quality.

According as the Grapes are pressed on the Middle, and that the Pipe fills, they empty it to fill the Puncheons or the Quarter Puncheons to a Pail-full, or thereabouts, according to the Largeness of the Casks wherein 'tis put ; to make it boil, they fill them up to the Hole of the Bung with the Wine which comes from the two first Pressings, and that which remained in the Pipe before they gave the two first Squeezings, and that which the others yield serves to put into the Wine when the first Boiling begins to be diminished.

One ought always to give to the Marc, whether it be white or red, four Pressings, without taking in the Lowering of the Beam, that is to say, that it ought to be cut four Times.

Some give it the third Working, with an Iron Gripple in the Middle of the Marc, and they leave all round about half a Foot in Breadth, to keep in that which is wrought ; and at the fourth Pressing they cut the Border that they left, and put it back upon the other.

They pretend that a Marc so ordered yields the more Wine. As the Marc of white Wine is the more thick, and has less Fire than the *Auvernat* ; it does not dry so presently, for this Reason there ought to be longer Times between these Squeezings.

They give them these commonly in the Night-time, because they do not lower the Beam, but when the Day's Work is finish'd, when the Men who are to work the Marc have supped.

When the white Wine is cold, it must be fill'd up and bung'd, and kept always full, at least

least if it be not in the Depth of Winter ; for when this kind of Wine is emptied it becomes yellow in most Countries ; but when this happens it is easily remedied, either by stirring it with a Stick of Hazel cleft into four, which is put in at the Bung-hole, or in shaking briskly the Puncheon, which they leave sometimes on the Bung, to the End that the Lee that descends thither, and afterwards is mixed again when the Cask is turned up, will take away the Yellowness.

This second Method seems to be the best ; for besides, that the Wine does not take Wind, it is also done in a great deal less Time ; for one is not obliged to unbung and bung again every Cask, for they may be fill'd up with a small Tin Funnel.

For some Years last past they have made Rapes of white Wines, from which they do not reap any great Advantage : They make use of them to mix with the coarse, harsh, red Wines, and that have but little of the Quality. In the mean time this fits the meaner Sort of People, who have not a very nice Taste, in that it pleases their Palates, and is sold cheap.

It will not be to any Purpose to name the Places of this Plot of Vineyards, which produce the best white Wines ; for the Merchants don't take the Pains to make a Distinction between the Wines which have much of the Quality, from others that have less ; besides, they are many times deceived, for some Citizens, who have a great many Houses of Wines in different Places, after the Vintage is over, they send that Wine they have made in one lesser Vintage, to be added to that of another that is much better, and so a Merchant thinks that all the Wine he buys is from the same Place, when it is not.

I do not approve of this Practice of the Citizens ; for a Merchant who would have Wine of one certain Place, will not be prepar'd to manage that which he shall have from another, because those different Wines will not produce the same Effects, with the Management he shall use to them, and no Person ought to be deceiv'd.

When the Vintage, either of red Wines or white Wines, is finish'd, the Press ought to be taken Care of, that the Rats don't gnaw the Screw of it. It should be rubb'd with Garlick, the Smell of which those Animals can't endure ; it is also good to cover it with some old Casks, to hinder any Filth from falling on the Screw, which can't be kept too clean.

Concerning Rapes, or New Wines.

Rapes have unhappily, for a considerable Time, been in use in these Vineyard Plots, and therefore I shall give some Account of them.

They make here three Sorts of Rapes in Vineyards.

The one is made of stoned Grapes : When they have put a third or half into a Puncheon they tread them down, either before or after

they have fill'd it with Wine. Some make it with Cuttings mingled with Grapes only, or with whole Grapes ; but I do not approve of this Manner, for all the Wine which is put upon these Rapes always tastes of the Grape-stone ; and for this Reason it is better to take it away, and not to leave any thing but the Grape, or at least to take away the Stalk of the Grape.

The Troughs being opened, they lay upon the Bottom a Bed of Cuttings, and after that a Bed of Grapes, and this they do 'till the Troughs are almost full, but it must always be done in such manner, that there must be a Layer of Cuttings upon each Bottom, or at each Head, to the End that the Wine may be the better drawn off by the means of a Tap, and after they have bored the Casks, they fill them with Wine.

Thirdly, They make a Rape of Cuttings only, without any Mixture of Grapes.

The two first Sorts of Rapes are scarcely spent but in the Country, I mean, in this Vineyard Plot.

Nothing is more effectually useful in a Family, or that one may make use of for putting off Low-Wines, or the Bottoms, and to give Colour and Strength to the Wines that want them, as I have said in the preceding Article ; but none but the best Grapes ought to be used for this Purpose, such as the *Samoiereau*, rather the *bard* or *fourcebis* than the tender, the *Auvernat*, *teint* or *red*, a little of the *large black*, or of the *teint* ; for if these two last have not Strength, they have much less of the Colour, and render the Wine marrowy or substantial.

These Rapes must be well boil'd ; and three or four Months after this has been done, that is to say, after the Winter, they must be clear'd or purify'd : Forty or fifty Pints may be drawn out of a Puncheon, and be put immediately into Wine that has less Colour, but is very near of the same Strength ; for the Rape ought not to be too soon weaken'd, nor the Wine too often mix'd with it.

The Wine being once upon the Stillings, ought not to be remov'd : This is the Reason why the Casks in which it is to be put, be of Wood that is well chosen and barred, having a double Hair Cloth at each End.

This Precaution must be used at the Time when they are sold, or before they are remov'd from the Place where they are made, or in putting them into Vaults : For these Rapes of Cuttings are made rather to be consum'd in other Countries than in our own.

They make use of this at *Paris* and other Places, to put off the bad small Wines, which would never sell but for these Rapes, for without this I know not what the *Parisians* would do with their wretched, small, tart Wine which their Vineyards of the *French* Country produces them.

This Wine is so pitiful, especially in rainy, cold, moist Years, that it is not able to sustain itself, and is spoil'd before it is vended.

The Cold takes from it that little Quality that it has, and the Heat turns it ; so that every

every thing is contrary to it; so that one may say the best of these Wines are such as have neither good or bad Quality.

Therefore one would chuse to pull up the greatest Part of the Vineyards that are about *Paris*, because they produce such poor Wine, that to make them pass, there is an absolute Necessity to have Recourse to these Rapes.

Of Vineyards in England.

There have of late Years been but very few Vineyards in *England*, tho' they were formerly very common, as may be gather'd from the several Places in divers Parts of *England*, which yet retain that Name; as also from ancient Records, which testify the Quantities of Ground which were allotted for Vineyards, to Abbeys and Monasteries for Wine for the Use of the Inhabitants: But as to the Quality of the Wines which were then produc'd in *England*, we are at present ignorant; and how these Vineyards were rooted up, and became so generally neglected, we have no very good Accounts left. Whatever might be the Cause of this total Neglect in cultivating *Vines* in *England*, I won't pretend to determine; but such was the Prejudice most People conceiv'd to any Attempts of producing Wine in *England*, that, for some Ages past, every Trial of that kind has been ridiculed by the Generality of People; and at this Day very few Persons will believe it possible to be effected.

Indeed if we judge only by the Success of some modern Essays made near *London*, where small Vineyards have been planted a few Years past, there would be no great Incouragement to begin a Work of this kind, because the Produce of very few of these Vineyards has been so kindly as were to be wish'd: But however this should not deter others from making farther Trials, especially when they consider the many Disadvantages which most or all of these Plantations are attended with: For first, there is scarce one of them plac'd upon a proper Soil and Situation for this Purpose; and secondly, there is not one which is rightly planted and managed, as I shall presently shew: And how can we expect Success from Vineyards under these Disadvantages, when even in *France* or *Italy* they would succeed little better, if their Management were not directed with more Judgment? I shall therefore humbly offer my Opinion, which is founded upon some Trials I have seen made, and from the Instructions which I have receiv'd from several curious Persons abroad, who cultivate Vineyards for their own Use and that of their Friends, and who have been very exact in observing the several Methods in Practice amongst the *Vignerons* of those Countries; from whence it is hop'd, that the Prejudice which most People have against a Project of this kind, will either be remov'd, or at least suspended, until Trials have been judiciously made of this Affair.

The first and great Thing to be consider'd in planting Vineyards is, the Choice of

Soils and Situations; which, if not rightly chosen, there will be little Hopes of Success; for upon this the whole Affair greatly depends. The best Soil for a Vineyard in *England*, is such whose Surface is a light, sandy Loam, and not above a Foot deep above the Gravel or Chalk, either of which Bottoms are equally good for *Vines*: But if the Soil is deep, or the Bottom either Clay or a strong Loam, it is by no means proper for this Purpose; for altho' the *Vines* may shoot vigorously, and produce a great Quantity of Grapes, yet these will be later ripe, fuller of Moisture, and so consequently their Juice not mature nor well digested, but will abound with Crudity, which in Fermenting will render the Wine sour and ill-tasted; which is the common Complaint of those who have made Wine in *England*.

Nor is a very rich, light, deep Soil, such as is commonly found near *London*, proper for this Purpose, because the Roots of these *Vines* will be inticed down too deep to receive the Influences of *Sun* and *Air*, and hereby will take in much crude Nourishment, whereby the Fruit will be render'd less valuable, and be later ripe, which is of ill Consequence to these Fruits, which are known to imbibe a great Share of their Nourishment from the *Air*, which is replete with Moisture (as is commonly the Case in *Autumn*), must necessarily contribute greatly to render the Juices less perfect: Therefore great Care should be had to the Nature of the Soil upon which they are planted.

The next Thing necessary to be consider'd is, the Situation of the Place; which, if possible, should be on the *North* Side of a River, upon an Elevation inclining to the *South*, with a small gradual Descent, that the Moisture may the better drain off; but if the Ground slopes too much, it is by no means proper for this Purpose: but if at a Distance from this Place, there are larger Hills which defend it from the *North* and *North-West* Winds, it will be of great Service, because hereby the *Sun's* Rays will be reflected with a greater Force, and the cold Winds being kept off, will render the Situation very warm. Add to this, a chalky Surface (which if those Hills do abound with, as there are many Situations in *England* which do), it will still add to the Heat of the Place by reflecting a greater Quantity of the *Sun's* Rays.

The Country about this should be open and hilly; for if it be much planted, or low and boggy, the Air will constantly be fill'd with moist Particles, occasion'd by the plentiful Perspiration of the Trees, or the Exhalations from the adjoining Marshes, whereby the Fruit will be greatly prejudic'd (as was before observ'd). These Vineyards should always be open to the *East*, that the Morning Sun may come on 'em to dry off the Moisture of the Night early, which by lying too long upon the *Vines*, does greatly retard the Ripening of their Fruit, and renders it crude and ill-tasted: And since the Fruit of *Vines* are rarely ever injur'd by *Easterly* Winds, so there will be no Reason to apprehend any Danger from such

a Situation; the *South-West*, *North-West*, and *North* Winds being the most injurious to Vineyards in *England* (as indeed they are to most other Fruit), so that, if possible, they should be shelter'd therefrom.

Having made Choice of a Soil and Situation proper for this Purpose, the next thing to be done is, to prepare it for Planting. In doing of which, the following Method should be observ'd: In the *Spring* it should be plough'd as deep as the Surface will admit, turning the Sward into the Bottom of each Furrow; then it should be well harrow'd to break the Clods, and cleanse it from the Roots of noxious Weeds: and after this, it must be constantly kept plough'd and harrow'd for at least one Year, to render the Surface light, and hereby it will be render'd fertile by imbibing the nitrous Particles of the Air (especially if it be long expos'd thereto before it is planted): Then in *March* the Ground should be well plough'd again; and after having made the Surface pretty even, the Rows should be mark'd out from *South-East* to *North-West*, at the Distance of ten Feet from each other; and these Rows should be cross'd again at five or six Feet Distance, which will mark out the exact Places where each Plant should be plac'd, so that there will be ten Feet Row from Row, and five or six Feet asunder in the Rows, nearer than which they ought never to be planted. And herein most People who have planted Vineyards, have greatly err'd, some having allowed no more than five Feet Row from Row, and the Plants but three Feet asunder in the Rows: And others, who think they have been full liberal in this Article, have only planted their *Vines* at six Feet Distance every Way; but neither of these have allow'd a proper Distance to them, as I shall shew: For in the first Place, where the Rows are plac'd too close, there will not be Room for the Sun and Air to pass in between them to dry up the Moisture, which being detain'd amongst the *Vines*, must produce very ill Effects. And secondly, where the *Vines* are plac'd in exact Squares, so near together as six Feet, there can be no Room for the Current of Air to pass between them, when their Branches are extended on each Side, and so consequently the Damps in *Autumn* will be entangled and detain'd amongst the *Vines*, to the great Prejudice of their Fruit. For since the *Autumns* in *England* are often attended with Rains, cold Dews, or Fogs, so all proper Care should be taken to remove every thing which may obstruct the drying up the Damps which arise from the Ground.

The skilful *Vignerons* abroad are also sensible how much it contributes to the Goodness of their *Vines* to allow a large Space between the Rows; and therefore where the Quality of the Wine is more regarded than the Quantity, there they never plant their *Vines* at less than ten Feet Row from Row, and some do allow twelve. It was an Observation of *Bellonius*, almost two hundred Years since, that in those Islands of the *Archipelago*, where the Rows of *Vines* were plac'd at a great Distance

the Wine was much preferable to those which were close planted; and this he positively affirms to be the Case in most Countries where he had travell'd. Indeed, we need not have Recourse to Antiquity for the Truth of such Facts, when we are daily convinc'd of this Truth in all close Plantations of any kind of Fruit, where it is constantly observ'd, that the Fruits in such Places are never so well colour'd, so early ripe, nor near so well flavour'd as those produc'd on Trees, where the Air can freely circulate about them, and the Rays of the Sun have free Access to the Branches, whereby their Juices are better prepar'd before they enter the Fruit.

Having thus consider'd the Distance which is necessary to be allow'd to these Plants, we come next to the Planting: But in order to this, the proper Sorts of Grapes should be judiciously chosen; and in this Particular we have egregiously err'd in *England*; all the *Vineyards* at present planted here, are of the sweetest and best Sort of Grapes for Eating, which is contrary to the general Practice of the *Vignerons* abroad, who always observe that such Grapes do never make good Wine, and therefore, from Experience, do make Choice of those Sorts of Grapes, whose Juice, after Fermenting, affords a noble, rich Liquor; which Grapes are always observ'd to be austere, and not by any means palatable. This is also agreeable to the constant Practice of our Cyder-makers in *England*, who always observe, that the best Eating Apples make but poor Cyder; whereas the more rough and austere Sorts, after being press'd and fermented, do afford a strong vinous Liquor. And I believe it will be found true in all Fruits, that where the natural Heat of the Sun ripens and prepares their Juices, so as to render them palatable, whatever Degree of Heat these Juices have more, either by Fermentation, or from any other Cause, will render them weaker and less spirituous. Of this we have many Instances in Fruits; for if we transplant any of our *Summer* or *Autumn* Fruits, which ripen perfectly in *England* without the Assistance of Art, into a Climate a few Degrees warmer, these Fruits will be mealy and insipid: So likewise if we bake or stew any of these Fruits, they will be good for little, losing all their Spirit and Flavour by the additional Heat of the Fire; and such Fruits as are by no means eatable raw, are hereby render'd exquisite, which if transplanted into a warmer Climate, have, by the additional Heat of the Sun, been also alter'd so as to exceed the most delicious of our Fruit in this Country.

From whence it is plain, that those Grapes which are agreeable to the Palate for Eating, are not proper for Wine; in making of which, their Juices must undergo a strong Fermentation. Therefore since we have in *England* been only propagating the most palatable Grapes for Eating, and neglected the other Sorts, before we plant Vineyards, we should take Care to be provided with the proper Sorts from abroad; which should be chosen according to the Sort of Wines intended to be imitated: Tho'

I believe

I believe the most probable Sort to succeed in *England* is the *Auvernat* or true *Burgundy Grape* (which whatever some Persons may pretend, is, at present, very rare, if to be found at all in *England*, most People taking the *Munier Grape* for the *Burgundy*): This Sort of Grape is most prefer'd in *Burgundy*, *Champaign*, *Orleans*, and most of the other Wine Countries in *France*; and I am inform'd, that it succeeds very well in several Places to the North of *Paris*, where proper Care is taken of their Management: So that I should advise such Persons who would try the Success of Vineyards in *England*, to procure Cuttings of this Grape from those Countries; but herein some Person of Integrity and Judgment should be employ'd to get them from such Vineyards where no other Sorts of Grapes are cultivated, which is very rare to find, unless in some particular Vineyards of the Citizens, who are very exact to keep up the Reputation of their Wines; nothing being more common than for the *Vignerons* to plant three or four Sorts of Grapes in the same Vineyard, and at the Time of Vintage to mix them all together, which renders their Wines less delicate than in such Places where they have only this one true Sort of Grape. And here I would caution every one against mixing the Juice of more Grapes than one Sort, which will cause it to ferment at different Times, and in different Manners.

The Cuttings being thus provided (for I would always prefer these to Layers, or rooted Plants, for the Reasons given at the Beginning of the Article *Vitis*), about the Beginning of *April* is the best Season for Planting; when it will be proper to put the lower Ends of the Cuttings in Water about three Inches, setting them upright for six or eight Hours before they are us'd; then at the Center of every cross Mark already made by a Line, to the Distance the *Vines* are design'd, should be a Hole made with a Spade or other Instrument, about a Foot deep: into each of which should be put one strong Cutting, placing it a little sloping, then the Hole should be fill'd up with Earth, pressing it gently with the Feet to the Cutting, and raising a little Hill to each about three Inches, so as to just cover the uppermost Eye or Bud, which will prevent the Wind and Sun from drying any Part of the Cuttings, and this upper Eye only will shoot, the under ones most of them will push out Roots; so that this Shoot will be very strong and vigorous.

After they are thus planted, they will require no other Care until they shoot, except to keep the Ground clear from Weeds, which should be constantly observ'd: But as to Watering, or any other Trouble, there will be no Occasion for it, notwithstanding what some People have directed; for in *England* there is no Danger of their miscarrying by Drought. When the Cuttings begin to shoot, there should be a small Stick of about three Feet long stuck down by each, to which the Shoots should be fasten'd to prevent their breaking or lying upon the Ground, so that as the

Shoots advance, the Fastening should be renew'd, and all small lateral Shoots (if there are any such produc'd) should be constantly displac'd, and the Ground between the *Vines* always kept clean. This is the whole Management which is requir'd the first Summer.

But at *Michaelmas*, when the *Vines* have done shooting, they should be prun'd; for if they are left unprun'd till *Spring*, their Shoots being tender (especially towards their upper Parts), will be in Danger of suffering, if the *Winter* should prove severe.

This Pruning is only to cut down all the Shoots to two Eyes; and if after this is done, the Earth be drawn up in a Hill about each Plant, it will still be a greater Defence against Frost.

At the Beginning of *March*, the Ground between the *Vines* should be well dug, to loosen it, and render it clean, but you should be careful not to dig deep close to the *Vines*, lest thereby their Roots should be cut or bruise'd; and at the same Time the Earth should be again laid up in a Hill about each Plant, but there must be Care taken not to bury the two young Eyes of the former Year's Shoot, which were left to produce new Wood.

At the Beginning of *May*, when the *Vines* are shooting, there should be some Stakes fix'd down to the Side of each Plant, which must be somewhat taller and stronger than those of the former Year; to these the two Shoots (if so many are produc'd), should be fasten'd, and all the small trailing or lateral Shoots should be constantly displac'd, that the other Shoots may be stronger; and the Ground should also be kept very clear from Weeds, as before.

At *Michaelmas* these *Vines* should be prun'd again, in the following Manner. Those of them which have produc'd two strong Shoots of equal Vigour, must be cut down to three Eyes each; but such which have one strong Shoot and a weak one, the strong one must be shorten'd to three Eyes, and the weak one to two; and such *Vines* which have produc'd but one strong Shoot, should be shorten'd down to two Eyes also, in order to obtain more Wood against the succeeding Year.

In the *Spring*, about the Beginning of *March*, the Ground between the *Vines* should be again dug, as before, and two Stakes should be plac'd down by the Side of all such *Vines* as have two Shoots, at such Distance on each Side of the Plant as the Shoots will admit to be fasten'd thereto; and the Shoots should be drawn out on each Side to the Stakes, so as to make an Angle of about forty-five Degrees with the Stem, but by no means should they be bent down horizontally, as is by some practis'd; for the Branches lying too near the Earth are greatly injur'd by the Damps which arise from thence, but especially when they have Fruit, which is never so well tasted, nor so early ripe upon those Branches, as when they are a little more elevated.

In *May*, when the *Vines* begin to shoot, they must be carefully look'd over, and all the weak dangling Shoots should be rubb'd off as they are

are produc'd, and those Shoots which are produc'd from strong Eyes, should be fasten'd to the Stakes to prevent their being broke off by the Wind. This Management should be repeated at least every three Weeks, from the Beginning of *May* to the End of *July*; by which Means, the Shoots which are train'd up for the succeeding Year will not only be stronger, but also better ripen'd and prepar'd for Bearing, because they will have the Advantage of *Sun* and *Air*, which is absolutely necessary to prepare their Juices; whereas, if they are crowded by a Number of small dangling weak Branches, they will shade and exclude the Rays of the Sun from the other Shoots, and so by detaining the Moisture a longer time amongst the Branches, occasion the Vessels of the young Wood to be of a larger Dimension, and hereby the crude Juice finds an easy Passage thro' them; so that the Shoots in *Autumn* seem to be mostly Pith, and are of a greenish immature Nature; and where-ever this is observ'd, it is a sure Sign of a bad Quality in the *Vines*.

The Soil also should be constantly kept clean, because if there are any Vegetables, (either Weeds or Plants of other Kinds) growing between the *Vines*, it will detain the Dews longer, and by their Perspiration occasion a greater Moisture than would be if the Ground were intirely clear; so that those who plant other Things between their Rows of *Vines*, are guilty of a great Error.

At *Michaelmas* the *Vines* should be prun'd, which Season I approve of rather than the *Spring* (for Reasons given already); and this being the third Year from planting, the *Vines* will begin to produce Fruit, therefore they must be prun'd accordingly. Now suppose the two Shoots of the former Year, which were shorten'd to three Eyes, have each of them produc'd two strong Branches the *Summer* past, then the uppermost of these Shoots upon each Branch should be shorten'd down to three good Eyes (never including the lower Eye, which is situate just above the former Year's Wood, which seldom produces any thing except a weak dangling Shoot); and the lower Shoots should be shorten'd down to two good Eyes each; these being design'd to produce vigorous Shoots for the succeeding Year, and the former are design'd to bear Fruit: But where the *Vines* are weak, and have not produc'd more than two or three Shoots the last Season, there should be but one of them left with three Eyes for Bearing, the rest must be shorten'd down to two, or if weak, to one good Eye, in order to obtain strong Shoots the following *Summer*; for there is nothing more injurious to *Vines* than the leaving too much Wood upon them, especially while they are young, or the over-bearing them, which will weaken 'em so much, as not to be recover'd again to a good State in several Years, tho' they should be manag'd with all possible Skill.

In *March* the Ground between the *Vines* should be well dug, observing not to injure their Roots by digging too deep near them; but where there are small horizontal Roots

produc'd, on or near the Surface of the Ground, they should be prun'd off close to the Place where they were produc'd; these being what the *Vignerons* call Day Roots, and are by no means necessary to be left on: And after having dug the Ground, the Stakes should be plac'd down in the following manner: On each Side of the *Vine* should be a Stake, put in at about sixteen Inches from the Root, to which the two Branches, which were prun'd to three Eyes each, for Bearing, should be fasten'd (observing, as was before directed, not to draw them down too horizontally); then another taller Stake should be plac'd down near the Foot of the *Vine*, to which the two Shoots, which were prun'd down to two Eyes, should be fasten'd, provided they are long enough for that Purpose; but if not, when their Eyes begin to shoot, these must be train'd upright to the Stakes, to prevent their trailing on the Ground, or being broke by the Wind.

In *May* the *Vines* should be carefully look'd over again, at which Time all weak lateral Branches should be rubb'd off as they are produc'd, and those Shoots which shew Fruit, must be fasten'd with Bais to the Stakes to prevent their being broke, until they are extended to three Joints beyond the Fruit, where they should be stopp'd: But the Shoots which are design'd for Bearing the following Season, should be kept train'd upright to the middle Stake; by which Method the Fruit-Branches will not shade these middle Shoots, nor will the middle Shoots shade the Fruit; so that each will enjoy the Benefit of *Sun* and *Air*.

This Method should be repeated every Fortnight or three Weeks, from the Beginning of *May* to the Middle or latter End of *July*, which will always keep the Shoots in their right Position, whereby their Leaves will not be inverted, which greatly retards the Growth of the Fruit, and by keeping the *Vines* constantly clear from horizontal Shoots, the Fruit will not be crowded with Leaves and shaded, but will have constantly the Advantage of *Sun* and *Air* equally, which is of great Consequence; for where the Fruit is cover'd with these dangling Shoots in the *Spring*, and are afterwards expos'd to the Air, either by divesting these of their Leaves, or else displacing their Branches intirely, as is often practis'd, the Fruit will become hard, and remain at a perfect Stand for three Weeks, and sometimes will never advance afterwards, as I have several times observ'd; therefore there cannot be too much Care taken to keep them constantly in a kindly State of Growth, as the *Vignerons* abroad well know, tho' in *England* it is little regarded by the Generality of Gardeners, who, when their Grapes suffer by this Neglect, immediately complain of the Climate, or the Untowardness of the Season, which is too often a Cover for Neglects of this Nature: And here I can't help taking Notice of the absurd Practice of those who pull off their Leaves from their *Vines*, which are plac'd near the Fruit, in order to let in the Rays of the Sun to ripen them; not considering how much they

they expose their Fruit to the Cold Dews, which fall plentifully in *Autumn*, which being imbib'd by the Fruit, does greatly retard them: Besides, no Fruit will ripen so well when entirely expos'd to the Sun, as when they are gently screen'd with Leaves; and by the pulling off these Leaves, which are absolutely necessary to prepare the Juices before they enter the Fruit, the gross Parts of which are perspir'd away by the Leaves, the Fruit must either be depriv'd of Nourishment, or else some of the gross Particles will enter with the more refin'd Parts of the Juice, and thereby render the Fruit worse than it would otherwise be, were the Leaves permitted to remain upon the Branches: For if the weak dangling Shoots are constantly displac'd as they are produc'd, the Fruit will not be too much shaded by the Leaves which are upon the bearing Branches.

When the Fruit is ripe, if the Stalks of the Bunches are cut half through a Fortnight before they are gather'd, it will cause the Juice to be much better, because there will not be near so great a Quantity of Nourishment enter the Fruit, whereby the watry Particles will have Time to evaporate, and the Juice will be better digested. This is practis'd by some of the most curious *Vignerons* in the South of *France*, where they make excellent Wine. But if after the Fruit be cut, it is hung up in a dry Room upon Strings, so as not to touch each other for a Month before they are press'd, it will also greatly add to the Strength of the Wine, because in that Time a great Quantity of the watry Parts of the Juice will evaporate. This is a constant Practice with some Persons, who inhabit in the *Tiroleze* on the Borders of *Italy*, where is made a most delicious rich Wine, as hath been attested by Dr. *Burnet* in his Travels, and I have heard the same from several Gentlemen who have travelled that Road since.

But with all the Care that can possibly be taken, either in the Culture of the *Vines*, or in making the Wine, it will not be near so good while the *Vineyard* is young, as it will be after it has been planted ten or twelve Years; and it will be constantly mending until it is fifty Years old, as is attested by several curious Persons abroad, as also by the most skilful Wine-Coopers at home, who can tell the Produce of a young *Vineyard* from that of an old one, after it is brought to *England*, by the Colour of the Wine. This Difference is very easily accounted for, from the different Structure of the Vessels of the Plants, those of young *Vines* being larger and of a looser Texture, do easily admit of a larger Quantity of gross Nourishment to pass through them; whereas those of old *Vines*, which are more woody, are more closely constricted, and thereby the Juice is better strain'd in passing through them, which must consequently render it much better, tho' the Grapes from a young *Vineyard* will be larger, and afford a greater Quantity of Juice: So that People should not be discourag'd, if their Wines at first are not so good as they would wish; since afterward, when the *Vineyard* is a few Years older, the Wine may answer their

Expectation. As to the Fermenting and Managing the Wine, that is treated of particularly under the Article of *Wines*, to which the Reader is desir'd to turn.

The *Vineyard* being now arriv'd to a bearing State, should be treated after the following Manner: First, In the Pruning, there should never be too many Branches left upon a Root, nor those too long; for although by doing of this, there may be a greater Quantity of Fruit produc'd, yet the Juice of these will never be so good as when there is a moderate Quantity of Fruit, which will be better nourish'd, and, the Roots of the Plants not so much weaken'd, which is found to be of so bad Consequence to *Vineyards*, that when Gentlemen abroad let out *Vineyards* to *Vignerons*, there is always a Clause inserted in their Leases to direct how many Shoots shall be left upon each *Vine*, and the Number of Eyes to which the Branches must be shorten'd, because were not the *Vignerons* thus ty'd down, they would overbear the *Vines*, so that in a few Years they would exhaust their Roots, and render them so weak, as not to be recover'd again in several Years, and their Wine would be so bad, as to bring a Disreputation on the *Vineyard*, to the great Loss of the Proprietor.

The Number of Branches which the *Italians* do generally agree to leave upon a strong *Vine*, are four; two of the strongest have four Eyes, and the two weaker are shorten'd down to two Eyes each; which is very different from the common Practice in *England*, where it is usual to see six or eight Branches left upon each Root, and those, perhaps, left with six or eight Eyes to each; so that if these are fruitful, one Root must produce near four times the Number of Bunches which the *Italians* do ever permit, and so consequently the Fruit will not be so well nourish'd, and the Roots will also be greatly weaken'd; as is the Case of all Sorts of Fruit-trees, when a greater Number of Fruit is left on than the Trees can nourish.

The next Thing is, constantly to keep the Ground perfectly clean between the *Vines*, never permitting any Sort of Plants or Weeds to grow there: The Ground should also be carefully dug every *Spring*, and every third Year should have some Manure, which should be of different Sorts, according to the Nature of the Ground, or which can be most conveniently procur'd.

If the Land is stiff, and inclinable to bind on the Surface, then *Sea-Sand* or *Sea-Coal* Ashes are either of them very good Manure for it; but if the Ground be loose and dry, then *Lime* is the best Manure for it. This must be spread thin upon the Surface of the Ground before it is dug, and in digging should be bury'd equally in every Part of the *Vineyard*. These are much preferable to any Sort of Dung for *Vines*, so that it will be worth the Expence to procure either of them: And as they do require manuring but every third Year, so where the *Vineyard* is large, it may be divided into three equal Parts; each of which may be manur'd in its Turn, whereby the

the Expence will be but little every Year, whereas when the Whole is manur'd together it will add to the Expence, and in many Places there can't be a sufficient Quantity procured to manure a large Vineyard in one Year.

This Digging and Manuring should always be perform'd about the Beginning of *March*, at which time all the superficial or *Day-Roots*, as they are call'd, must be cut off, but the larger Roots must not be injur'd by the Spade, &c. therefore the Ground close to the Stem of the *Vines* must not be dug too deep. After this is done, the Stakes should be placed down, one on each Side the *Vines*, at about sixteen Inches from their Stems, to which the longest Bearing-branches should be fasten'd, and one Stake close to the Stem, to which the two shorter Branches should be trained upright, to furnish Wood for the succeeding Year.

In the *Summer* they must be carefully look'd over, as before, rubbing off all weak, dangling Shoots, and training the good ones to the Stakes regularly, as they are produced, and those of them which have Fruit, should be stopp'd in *May*, about three Joints beyond the Bunches; but the upright Shoots, which are design'd for Bearing the following Year, must not be stopp'd till the Beginning of *July*, when they may be left about five Feet long; for if they are stopp'd sooner in the Year, it will cause 'em to shoot out many dangling Branches from the Sides of the Eyes, which will not only occasion more Trouble to displace 'em, but also will be injurious to the Eyes or Buds.

N. B. All this *Summer-Dressing* should be perform'd with the Thumb and Finger, and not with Knives, because the Wounds made by Instruments in *Summer*, do not heal so soon as when stopp'd by gently nipping the leading Bud, which if done before the Shoot is become woody, it may be effected with great Ease, being very tender while young.

When a Vineyard is thus carefully dress'd, it will afford as much Pleasure in viewing it as any Plantation of Trees or Shrubs whatever, the Rows being regular, and if the Stakes are exactly placed, and the upright Shoots stopp'd to an equal Height, there is nothing in Nature which will make a more beautiful Appearance; and during the Season that the *Vines* are in Flower, they do emit a most grateful Scent, especially in a Morning and Evening, and when the Grapes begin to ripen, there will be a fresh Pleasure arising in viewing of them.

But as the Beauty of Vineyards arises from the regular Disposition of the Branches of the *Vines*, so great Care should be taken in their Management, to train 'em regularly, and to provide every Year for new Wood to bear the succeeding Year, because the Wood which has produced Fruit, is commonly cut quite away, after the Fruit is gathered; or at least is shorten'd down to two Eyes, to force out Shoots for the next Year, where there is not a sufficient Number of Branches upon the

Vine, of those trained upright; so that in *Summer*, when the *Vines* are in Perfection, there should be six upright Shoots trained for the next Year's Wood, and three or four Bearing-branches, with Fruit on them; more than these ought never to be left upon one *Vine*, for the Reasons before given.

N. B. The *Auvernat*, or *True Burgundy Grape*, is valued in *France* before any other Sort, because the Fruit does never grow very close upon the Bunches, so that they are more equally ripen'd, for which Reason it should also be preferr'd in *England*; though, in general, those Sorts are most esteem'd with us that have always close Bunches, which is certainly wrong; for it may be observed, that the Grapes upon such Bunches are commonly ripe on one Side, and green on the other, which is a bad Quality for such as are press'd to make Wine.

I shall now subjoin a few Sorts of *Vines* which are preserv'd in some curious Gardens, more for the Sake of Variety than the Value of their Fruit: These are,

1. *VITIS; sylvestris, Virginiana: Park. Theat.* The wild Virginian Grape.
2. *VITIS; vulpina dictas Virginiana alba. Pluk. Alm.* The Fox Grape, *vulgô*.
3. *VITIS; alba dulcis, foliis variegatis.* The blotch'd-leav'd Vine.
4. *VITIS; alba dulcis, limbis foliorum argenteis.* The strip'd leav'd Vine.
5. *VITIS; quinquefolia, Canadensis scandens. Tourn.* The Virginian Vine or Common Creeper.

The first and second Sorts do grow in great Plenty in the Woods of *America*, where, I have been inform'd, are many other Sorts, some of which do produce Fruit very little inferior to most of our fine Sorts which are cultivated in *Europe*; notwithstanding which, it is generally thought impossible to make Wine in *America*; but this, I dare say, must proceed from a Want of Skill, rather than any bad Quality in the Soil or Climate: So that instead of planting Vineyards on their loose, rich Lands (as hath generally been practis'd by the Inhabitants of those Countries), if they would plant them upon rising Ground, where the Bottom was rocky or hard near the Surface, I dare say they would have very good Success; for the great Fault complain'd of in those Countries, is, that the Grapes do generally burst before they are fully ripe, which must certainly be occasion'd by their having too much Nourishment; therefore, when they are planted on a poorer Soil, this will be, in part, remedied. Another Cause of this may proceed from the Moisture of the Air (occasion'd by the Perspiration of Trees, &c.) which being imbib'd by the Fruit may break their Skins. This indeed, can't be prevented until the Country is better clear'd of the Timber; but however, this should caution People not to plant *Vines* in such Places where there are great Quantities of Woods, because of this Effect which it hath on the Grapes. But to return.

These

These two Sorts of *Vines* are preserved in the Gardens of those who are curious in Botany, but I have not seen either of 'em produce Fruit in this Country. These may be propagated by Layers, which will take Root in one Year, and may be taken off and transplanted in the *Spring* where they are to remain, which should be against a warm Wall, because if they are expos'd to much Cold in *Winter*, they are often destroy'd, especially while they are young.

Their Pruning and Management is the same with any other Sorts of Grapes, but only they should have fewer Shoots, and those shorten'd down very low, otherwise they will make very weak Shoots, and never arrive to any considerable Strength, so will not be capable of producing Fruit.

The two Sorts with strip'd Leaves are also preserv'd by those who are curious in collecting a Variety of Plants. These may be propagated as the other Kinds of Grapes, but are tender, and so must have a warm Situation, otherwise they will not thrive; nor do the Cuttings of these take Root so readily as those whose Leaves are plain: But as there is no very great Beauty in these Plants, so they are scarcely worth cultivating, unless for Variety.

The fifth Sort was originally brought from *America*, but from its Hardiness, and being easy to propagate, is become as common as if it were a Native of this Country.

This Plant is chiefly planted in small Gardens near *London*, where it endures the Smoak better than most other Plants; and being a rampant Grower, is planted against high Walls and Buildings, which it will cover sooner than any other Sort of Plant, and in *Summer* will look green, which is what the Inhabitants of *London* are greatly pleas'd with. The Branches of this Plant will sometimes shoot twenty or thirty Feet long in one *Summer*, and do send forth Roots from their Joints whereby they fasten themselves to the Building where they are placed, so that they do not require much Trouble to support them.

The only Culture they require, is to cut out all the small weak Shoots in *March*, and shorten the strong ones to about ten Feet long, which will strengthen them against the succeeding *Summer*, and cause them to shoot vigorously.

This Plant may be propagated by Cuttings, which should be planted in the *Spring* upon a shady Border, where they will take Root freely, and if water'd in dry Weather, will make a great Progress the succeeding *Summer*, and the *Spring* after may be transplanted where they are to remain, which may be in almost any Soil or Situation, for they are very hardy Plants.

VITIS IDÆA: The Bilberry or Whortleberry-bush.

The Characters are;

The Flower consists of one Leaf, which is shap'd like a Pitcher; from whose Empalement

arises the Pointal, fix'd like a Nail, in the upper Part of the Flower, which afterwards becomes a soft umbilicated Fruit, or Berry, full of Juice, in which are enclos'd Seeds, for the most part small.

The Species are;

1. **VITIS IDÆA;** magna quibusdam, five *Myrtillis grandis*. J. B. The great Bilberry-bush.

2. **VITIS IDÆA;** foliis oblongis crenatis, fructu nigricante. C. B. P. Black Wharts, Whortle-berries, or Bilberry.

3. **VITIS IDÆA;** sempervirens, fructu rubro. J. B. Red Whorts or Whortle-berries.

4. **VITIS IDÆA;** Æthiopica, Buxi minoris folio, floribus albicantibus. H. A. Æthiopian Whortle-berry with a Lesser Box-leaf and white Flowers.

5. **VITIS IDÆA;** Americana, foliis subrotundis, hirsutis, ex adverso nascentibus, floribus minimis herbaceis, fructu parvo rubro. American Whortle-berry, with roundish hairy Leaves growing by Pairs, small greenish Flowers, and a small red Fruit, vulgarly call'd St. Peter's-wort.

The first and third Sorts do grow wild in *Yorkshire*, *Derbyshire*, *Westmoreland*, and other Northern Countries of *England*, as also upon the *Alps*, and other lofty Mountains in several Parts of *Europe*; but can't by Art be cultivated in Gardens near *London*, so as to thrive and produce Fruit. The first commonly grows to the Height of three or four Feet, in its native Places of Growth, and produces great Quantities of Fruit, which the poor Inhabitants of those Countries gather, and sell in the Markets for Tarts, &c. The third Sort is a very humble Plant, seldom growing much taller than the Dwarf *Dutch Box* (which is us'd for edging of Borders): This produces in its native Places of Growth, large Quantities of red Fruit; but these will rarely grow in Gardens, unless planted in a strong, cold Soil, and a shady Situation.

The second Sort is very common upon marshy or boggy Heaths, in divers Parts of *England*, and will grow to the Height of three or four Feet in such Places, and produce great Quantities of Fruit, which ripen in *July*, and are gathered by the poor People for the same Uses as the first Sort.

This is also very difficult to cultivate in Gardens: The only Method is, to take up some Plants in the *Spring*, from the Places of its Growth, with Balls of Earth to their Roots, and transplant them into a moist, shady Part of the Garden, where, if the Soil be not too rich or warm, they will thrive tolerably well, provided the Ground is not dug or cleaned, for these Plants will grow best on such Places as are never cultivated. This Sort is directed by the College of Physicians to be used in Medicine.

The fourth Sort is a tender Plant which is preserv'd in the Gardens of those who delight in preserving Exotick Plants. This is propagated by Layers, which should be lay'd down

down in the *Spring*, observing to make a little Slit in the Part which is laid in the Ground (in the manner as is practis'd in Laying of Carnations), and in dry Weather they must be frequently water'd, which will greatly facilitate their taking Root; and in the following *Spring* they may be cut off from the old Plants, and planted each into a separate Pot, filled with strong, fresh Earth, and placed upon a moderate Hot-bed which will facilitate their taking fresh Root; but they must be shaded from the Sun with Mats, and frequently water'd.

In the *Summer* these Plants may be exposed in the open Air, with other hardy Exotick Plants; and in *Winter* they must be placed in the Green-house, where they should have as much free Air as possible in mild Weather, and must be frequently water'd, otherwise they will not thrive.

These Plants produce their Flowers in *Winter* and *Spring*, but do rarely produce Fruit in this Country.

The fifth Sort grows to a Shrub of six or seven Feet high, and though a Native of *America*, yet will endure the severest Cold of our Climate in the open Air. It may easily be propagated by Layers or Suckers, which are generally produced in great Plenty from the Roots of the old Plants; these should be taken off either in *Spring* or *Autumn*, and planted out amongst other Shrubs of the same Growth, where they will add to the Diversity, but there is little Beauty in them; for their Flowers (which are produced in *September*) are very small, and of a greenish Colour, so that unless a Person search for them, they may escape the Sight, being always situate amongst the Leaves.

These Flowers are succeeded by small red Fruit, which ripen in *Winter*, after the Leaves are fallen off, so are more visible than the Flowers. This Fruit is not used in its native Country, it having very little Taste, and being so very small, can't be worth the Trouble of Gathering. I suppose this Shrub had the Name of *St. Peter's-wort* impos'd on it before it produced either Flowers or Fruit in *England*, from the Resemblance which the Leaves of it has to those of *Ascyron*, or *St. Peter's-wort*, for in other respects it differs widely from the Characters of that Genus.

VITIS SYLVESTRIS; vide Clematidis.

ULMUS: The Elm-Tree.

The Characters are;

The Flower consists of one Leaf, which is shap'd like a Bell, having many Stamina (or Threads) in the Center; from the Bottom arises the Pointal, which afterwards become a membranaceous or leafy Fruit, almost Heart-shap'd, in the Middle of which is placed a Pear-shap'd Seed-Vessel, containing one Seed, for the most part of the same Shape.

The Species are;

1. ULMUS; vulgarissima, folio lato scabro. Ger. Emac. The common rough-leav'd Elm.

2. ULMUS; folio latissimo scabro. Ger. Emac. The Witch-Hazel or broad-leav'd Elm, by some unskilful Persons called the British Elm.

3. ULMUS; minor, folio angusto scabro. Ger. Emac. The small-leav'd or English Elm.

4. ULMUS; folio, glabro. Ger. Emac. The smooth-leav'd or Witch-Elm.

5. ULMUS; major Hollandica, angustis & magis acuminatis samarris, folio latissimo scabro. Pluk. Alm. The Dutch Elm.

6. ULMUS; minor, folio angusto scabro, elegantissime variegato. The English Elm with beautiful strip'd Leaves.

7. ULMUS; folio glabro eleganter variegato. The Witch-Elm with strip'd Leaves.

8. ULMUS; minor foliis flavescentibus. The yellow-leav'd Elm.

9. ULMUS; major Hollandica, angustis & magis acuminatis samarris, folio latissimo scabro, eleganter variegato. The Dutch Elm with strip'd Leaves.

The four first mention'd Sorts are very common in divers Parts of *England*, though it is generally believed neither of 'em were originally Natives of this Country: but however that be, they have propagated themselves by Seeds and Suckers which have arose from the Roots of old Trees, in such Plenty, as hardly to be rooted out, where they have long had Possession, especially in Hedge Rows, where there is Harbour for their Roots, which, when left undisturb'd, will send forth a fresh Parcel of young Plants annually, from whence the People who supply the Nursery-men do gather them.

The fifth Sort is equally hardy, and almost as common in *England* as either of the former; this is pretty quick of Growth while young, and will outstrip the common *English Elm* for several Years; but after twenty or thirty Years growth, the *English Elm* will get the better every Year, and the Timber thereof being much preferable to that of the *Dutch Elm*, renders it more valuable for Planting.

The Sorts with strip'd Leaves are preserv'd by those who are curious in collecting variegated Plants, but they are not worth propagating unless for the Sake of Variety; being of slower Growth, and in most People's Judgment, less beautiful than the plain Sorts.

These Plants may be either propagated by Layers or Suckers taken from the Roots of the old Trees, the latter of which is greatly practis'd in many Places; but as these are often cut up with very indifferent Roots, so they very often miscarry, and render the Success doubtful; whereas those which are propagated by Layers are in no Hazard, and do always make better Roots, and come on faster than the other, for which Reasons this Method should be more universally practis'd. And since a small Compass of Ground fill'd with Stools of these Plants, will be sufficient to furnish a Nursery of a considerable Extent, annually, with Layers to be transplanted, so it is richly worth every Person's while, who would

would cultivate these Trees, to allot a Piece of Ground for this Purpose.

The best Soil for such a Nursery is a fresh Hazel Loam, neither too light and dry, nor over moist and heavy; this Ground should be well trench'd, and a little rotten Dung bury'd therein; and in doing of this, great Care should be taken to pick out all Roots of pernicious Weeds, which if left in the Ground would be very injurious to the Layers, and can't afterwards be so easily rooted out; then having laid the Ground level, the Plants must be planted at about eight Feet asunder each Way: The best Season for this Work is in *Autumn*, as soon as the Leaves begin to decay, that they may take Root before the dry Weather in the *Spring* comes on, whereby a great Expence of watering them will be sav'd; for if they are well settled in the Ground before the dry Weather, they will require little more than to mulch their Roots, to keep the Earth from drying.

These Plants should be permitted to grow rude two Years, during which Time the Ground between should be carefully cleaned and dug every *Spring*; by this Time they will be strongly rooted, and have made pretty strong Shoots, so that they may be lay'd in the Ground: The manner of performing this being already describ'd in the Article of *Layers*, I shall forbear repeating it in this Place.

When these Layers are well rooted, they should be taken off, and transplanted out into a Nursery, which should be upon a good Soil and well prepared (as before for the Stools). The Plants should be planted in Rows four Feet asunder, and two Feet distance Plant from Plant in the Rows. This should be done in *Autumn*, as soon as the Leaves begin to decay; and if there is some Mulch laid upon the Surface of the Ground about their Roots, it will preserve 'em from being hurt by Frost in *Winter*, and from drying Winds in *Spring*, and thereby secure 'em from all Hazard.

The following *Summer* the Ground between 'em should be constantly kept clean from Weeds, and in *Autumn* they should be pruned up, cutting off all strong lateral Shoots, which, if left on, would impede their upright Growth; but there must be some of the smaller Shoots left on to detain the Sap, in order to augment the Stems of the Trees; for where they are pruned up too naked, they are apt to grow up too slender to support themselves, so that their Heads will recline to the Ground, and cause their Stems to grow crooked.

In this Nursery they may remain five or six Years, observing constantly to dig the Ground between 'em every *Spring*, and to trim them as before directed, which will promote their Growth, and render them strong enough to transplant out where they are to remain, in the Time before-mentioned.

These Trees are very proper to plant in Hedge-Rows, upon the Borders of Fields, where they will thrive much better than when planted in a Wood or close Plantation, and

their Shade will not be very injurious to whatever grows under them; but when these Trees are transplanted out upon Banks after this manner, the Banks should be well wrought and clear'd from all other Roots, otherwise the Plants, being taken from a better Soil, will not make much Progress in these Places. About *Michaelmas* will be a good Time for this Work, for the Reasons before assigned, but when they are planted, there should be some Stakes fix'd in by them, to which they should be fasten'd, to prevent their being displaced by the Wind; and part of their Heads should be taken off, before they are planted, which will also be of Use in preventing their being easily over-turn'd by Winds, but by no means should their leading Shoot be stopp'd, nor their Branches too closely cut off; for if there are not some Shoots left on to draw and attract the Sap, they will be in Danger of miscarrying.

These Trees are also proper to plant at a Distance from a Garden or Building, to break the Violence of Winds, for which Purpose there is not any Tree more useful; for they may be trained up in Form of a Hedge, keeping 'em cut every Year, which will cause 'em to grow very close and handsome, to the Height of forty or fifty Feet, and be a great Protection against the Fury of Winds; but they should not be planted too near a Garden, where Fruit-trees or other Plants are placed, because the Roots of the *Elms* do run superficially near the Top of the Ground to a great Width, and will intermix with the Roots of the other Trees, and deprive 'em of Nourishment; nor should they be planted near Gravel or Grass-Walks, which are design'd to be well kept, because the Roots will run into them, and send forth Suckers in great Plenty, which will deface the Walks, and render them unsightly.

But for large Gardens, where Shade is required, there is scarce any Tree so proper for that Purpose, being easy to remove when grown to a considerable Size, so that a Person who is willing to have his Plantations for Shade in a short Time, may procure Trees of two Feet Circumference in their Trunk, which will be in no Danger of succeeding, provided they are removed with Care; and these will take Root and grow again, almost as well as young Plants, which is what few other Sorts of Trees will do; but then they should be such Trees as have been thus regularly train'd up in a Nursery, and have good Roots, and not such as are taken out of Hedge-Rows (as is by some practis'd), which seldom rise with any tolerable Roots, and consequently do often miscarry.

In Planting of these Trees, great Care should be taken not to bury their Roots too deep, which is very injurious to them, especially if they are planted on a moist Loam or Clay, in which Case, if the Clay is near the Surface, it will be the best Way to raise the Ground in a Hill, where each Tree is to be placed, which will advance their Roots above the Surface of the Ground, so that they will

not be in Danger of rotting in *Winter* with Moisture.

When these Trees are propagated by Suckers taken from the Foot of old Trees, they are commonly lay'd into the Ground very close in Beds, where, in dry Weather, they may be frequently water'd, to encourage their putting out Roots: In these Beds they are left two Years, by which time those that live will be well rooted (though a great many of them generally die); then they should be transplanted into the Nursery, and manag'd as hath been directed for the *Layers*.

There are some who raise the *Witch-Elm* from Seeds, which it generally produces in great Plenty, and are ripe in *April*. These should be sown upon a Bed of fresh, loamy Earth, and gently cover'd; in dry Weather they should be water'd, and if the Bed is shaded from the violent Heat of the Sun, it will be of great Service to the Seeds (for I always observe, the Plants to come up better in the Shade than when exposed to the Sun); when the Plants come up they should be carefully clear'd from Weeds, and after they have stood two Years in the Seed-bed, they will be fit to plant out into the Nursery, where they must be manag'd as the former.

Sometimes the common *English Elm* will produce Seeds, but it is not so constantly fruitful as the *Witch-Elm*, which seldom fails to produce great Quantities, when they have arriv'd to a due Maturity, which Seeds will fall to the Ground; and when they light upon a Spot which is not disturb'd, the Plants will come up in great Plenty.

The Timber of the common *English Elm* is generally preferr'd to the rest, though that of the *Witch-Elm* is often as good, and is the largest Tree, when planted on a kindly Soil: But the *Dutch Elm* affords the worst Timber, and never will grow to the Stature of either of the other Sorts, so that this should not be cultivated for the Timber; therefore the best Way to be sure of the Kinds which a Person would chuse to propagate, is to have a Nursery of Stools, in order to furnish Layers; for when they are grubbed up from Hedge-Rows, there will often be many Sorts intermix'd, especially if the People who go about to gather 'em do furnish them, because they take 'em indifferently where-ever they can procure them; so that when they are planted out thus blended together, there will be a considerable Difference in their Growths, which will deface the Plantation.

UMBELLA, an Umbel; is the Extremity of a Stalk or Branch, divided into several Pedicles, or Rays, beginning from the same Point, and opened in such a manner as to form an inverted Cone. When the Pedicles, into which the Stalk is divided, are subdivided into others of the same Form, upon which the Flowers or Fruits are dispos'd, the first Order is call'd *Rays*, the second *Pedicles*. That Umbel which consists of Pedicles only, is call'd a *Simple Umbel*; that which is com-

pos'd both of Rays and Pedicles, is call'd a *Compound Umbel*.

UMBELLIFEROUS PLANTS, are such whose Flowers are produced in an Umbel, on the Top of the Stalks, where they, in some manner, represent an *Umbrella*; of this Kind are *Parsnips*, *Carrots*, *Fennel*, *Parsley*, &c.

URTICA, [so call'd of *urere*, Lat. to burn, because this Plant being touch'd, burns very much.] The Nettle.

The Characters are;

It hath an apetalous Flower, consisting of many Stamina included in an Empalement, but these are barren; for the Embryo's are produced either on different Plants, or on different Parts of the same Plant, without any visible Flower, which afterwards become a bivalve Seed-vessel, sometimes gathered into round Heads, and at other times are small and hairy, enclosing several Seeds.

The Species are;

1. URTICA; *urens, maxima*. C. B. P. The greatest Stinging-nettle.
2. URTICA; *urens, minor*. C. B. P. The lesser Stinging-nettle.
3. URTICA; *urens, pilulas ferens*, 1. *Dioscoridis, semine lini*. C. B. P. Pill-bearing Stinging-nettle, with a Seed like Flax.
4. URTICA; *altera, pilulifera, Parietariae folius*. H. R. Par. Another Pill-bearing Stinging-nettle with Leaves like Pellitory, commonly call'd Spanish Marjoram.
5. URTICA; *pilulifera, folio angustiori, caule viridi*, *Balearica. Salvad.* Narrower-leav'd Pill-bearing Stinging-nettle from Majorca with a green Stalk.

The first of these Sorts is a very common Weed upon the Sides of Banks, Ditches, and other uncultivated Places, where its Roots will spread and over-run the Ground, so that it should always be carefully extirpated from Gardens. It is sometimes used in Medicine, but may be easily procured from the Fields at almost any Season.

The second Sort is also a very common Weed in Gardens and cultivated Fields, but it being an annual Plant, is not so difficult to eradicate as the former.

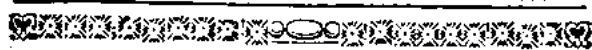
The third, fourth, and fifth Sorts are preserved in many Gardens for Variety, but the fourth, which is commonly call'd *Spanish Marjoram*, is the most common in *English* Gardens, where it is cultivated for making Sport, many ignorant Persons taking it for a Sort of *Marjoram*, are often severely stung by smelling to it; and others put it into the Middle of Nosegays, amongst other Greens, which they present to Persons who are not acquainted with the Plant, and so by smelling to it, they suffer in like manner as the former.

The third Sort is mention'd to grow wild in *England*, but the other two are brought from warmer Countries.

All these Plants may be easily propagated by sowing their Seeds in *March*, upon a Bed of light rich Earth, and when the Plants are come

come up, they should be transplanted out into Beds, or the Borders of the Pleasure-Garden, interspersing 'em amongst other Plants, so that they may not be so easily discover'd by Persons whom there is a Design to deceive, by gathering a Sprig from them to smell to; after the Plants have taken Root, they will require no farther Care, but only to keep 'em clear from Weeds; in *June* they will flower, and their Seeds will ripen in *Autumn*, which, if permitted to shed upon the Ground, will come up the following *Spring*, and flourish without any farther Care.

The Seeds of the third Sort are sometimes used in Medicine.



W A

WALKS: In order to the laying *Walks* in Gardens, it will be very proper that the Bottom of them be fill'd with some Lime-rubbish or coarse Gravel, Flint-stones, or other rocky Stuff, which will be very serviceable in preventing Weeds from growing through the Superficies of Gravel; this Bottom should be laid eight or ten Inches thick, over which the Coat of Gravel should be six or eight, which Gravel should be fine, but yet not skreen'd, because that spoils it. This should be laid on a Heap, rounding, so that the larger, rough Stones may run down on the Sides, which being every now and then rak'd off, the Gravel by that means will be sufficiently fine.

After the Gravel has been laid to the Thickness above-mention'd, then the *Walks* must be rak'd true and level, from all great Drips as well as little Holes; by this means most of the Stones of the *Walks* will be rak'd under your Feet, which should rather be gently sprinkled back again, over the last Length that is rak'd, than bury'd (as is the Practice of many Gardeners), for by this means the *Walk* will lie much harder, and the coarsest Stones will very much contribute to its Firmness.

There is also a great Fault committed frequently, in laying *Walks* too round, and some to that Degree, that they cannot be walk'd on with that Ease and Pleasure that ought to be; and besides, this too great Rounding takes off much from the seeming Breadth of the *Walk*.

The common Allowance for a *Gravel-walk* of five Feet Breadth, is an Inch in the Crown; so that if a *Walk* be twenty Feet wide, according to this Proportion, it will be four Inches higher in the Middle than on each Side; and a *Walk* of twenty-five Feet, will be five Inches; one of thirty Feet, six Inches; and so on.

When a *Walk* has been thus carefully laid, or rather after every Length or Part of it, (which commonly is about fifteen Feet each), then it should be rolled well, both in length and

also cross-ways: The Person who rolls it should wear Shoes with flat Heels, that he may not make Holes in the *Walks*; for when they are once made in a new *Walk*, it will not be easy to roll them out again.

In order to lay *Gravel-walks* firm, it will be necessary to give them three or four Water-rollings; that is, they must be rolled when it rains so very fast, that the *Walks* swim with Water; this will cause the Gravel to bind; so that when the *Walks* come to be dry, they will be as hard as a Terrace.

Iron-mould Gravel is accounted the best for Binding; or Gravel with a little binding Loam amongst it, which latter, tho' it be apt to stick to the Heels of Shoes, in hot wet Weather, yet nothing binds better in dry Weather.

When the Gravel is over sandy or sharp, Loam is frequently mix'd with it, which, if they be cast together in Heaps, and well mixed, will bind like a Rock; whereas loose Gravel is as uncomfortable and uneasy to walk on, as any other Fault in a *Walk* can render it.

The best Gravel for *Walks* is such as abounds with smooth Pebbles (as is that dug at *Black-beath*), which being mix'd with a due Proportion of Loam, will bind like a Rock, and is never injur'd by wet or dry Weather; and the Pebbles being smooth, are not so liable to be turn'd up, and loosen'd by the Feet in walking; as are those which are angular and rough; for where *Walks* are laid with such Gravel as is full of irregular Stones, they appear unsightly in a Day's time after Rolling, because the Stones will rise upon the Surface whenever they are walk'd upon, but the smooth Pebbles will remain handsome two or three Days without Rolling.

The Width of these *Walks* must always be proportion'd to their Length, and the Size of the Garden; but small *Walks* are every where disagreeable; so that if the *Walks* were to be only two hundred Feet long, I should advise 'em to be made fourteen or fifteen Feet wide; for it is much better to have but few *Walks* in a Garden, and those to be spacious, than to make many small *Walks*, as is often practised.

Grass-walks in a Garden are both ornamental and delightful, in *Summer* time and dry Weather.

These may be made either by laying them with Turf, or sowing them with Hay-seed, and raking them fine and level, which, with keeping them well rolled, and frequently mow'd, will make the Grass fine.

These may be laid a little rounding, to cast off the Water the better, but the Slope must not be so great as to be discover'd with the Eye: About a fourth Part of the Roundness allow'd for *Gravel-walks*, will be sufficient for these, if in wet Ground; but if the Ground be dry, it is the best Way to lay 'em quite level.

Sometimes there are Water-tables on each Side of these *Walks*, which is very good for draining them, and also for keeping the Grass and Weeds from mixing with the Borders; and

and besides, these Water-tables render the *Walks* the handsomer, and appear the more beautiful.

These Water-tables ought to be new cut once or twice a Year, and this ought to be done by a straight Line, as exactly as possible.

The oftner these *Walks* are mowed and rolled in *Summer*, the thicker their Bottoms will be; and in *Autumn* the Grass should be kept very short, and well rolled, for if it be permitted to grow pretty long at this Season, the Blade will decay in *Winter*, and greatly injure their Roots. The Worm-casts must also be carefully beat to Pieces with a long Ash-Pole, and so spread over the Grass; this the Gardeners call *Poling of a Walk*, which is done by brushing the Surface of the Ground strongly with a slender Pole; the oftner this is repeated, the better it is for the Grass, besides, it will destroy the Worm-casts, and render the *Walks* more beautiful.

WALLS: As for the Matter, Dimensions, or Position of *Walls*, &c. See the Articles *Garden*, *Kitchen-Garden*, *Orchard*, &c.

Of all Materials proper for building *Walls* for Fruit-trees, Brick is the best, in that it is not only the handsomest, but the warmest and kindest for the Ripening of Fruit; besides, that it affords the best Convenience of Nailing; for smaller Nails will serve in them than in *Stone-walls*, where the Joints are larger: And *Brick-walls* with Copings of Free-stone, and Stone Pilasters or Columns, at proper Distances, to separate the Trees and break off the Force of the Winds, make not only the most beautiful, but the most profitable *Walls* of any others.

It has been propos'd by some to build *Garden-walls* with Half-rounds, every Semi-circle being about six Yards in the Face or Diameter, and eight Yards round on the Outside, each taking in two Trees, and so to make two Feet Breadth of plain *Walling* between every Half-round; on the Top of each may be placed a Flower-pot, of two Feet high, to contain a handsome Green, and a Vine planted at the Foot, to fill up the Space to the Top: If a *Wall* be so built, every Part of it will, by the means of these Rounds, enjoy a Share of the Sun, one Time of the Day or the other; and the best *Walls* will not fail to be very hot, by Reflection or Collection of the Beams of the Sun in the Rounds, and they will also be more secure from injurious Winds.

In some Parts of *England* there are *Walls* built both of Brick and Stone, which have been very commodious. The Bricks of some Places are not of themselves substantial enough for *Walls*, nor are they any where so durable as Stone; and therefore some Persons, that they might have *Walls* both substantial and wholsome, have built double ones, the Outside being of Stone and the Inside of Brick, or a *Stone-wall* lin'd with Brick.

And where *Walls* are built for Fruit against *Terrace-walks*, to prevent the ill Effects of Damps, it is a very good Method to leave a

Space of about two Feet, the whole Length of the *Wall*, between the inner one next to the Bank of Earth, and the outward one which is to receive the Fruit, which will render the outward *Wall* always healthful, and the Product of the Fruit may be answerable to the Cost.

Mr. *Fairchild* having observed, that all Peach-trees that grow in a shallow Soil with a gravelly Bottom, canker and decay as soon as they reach the Gravel, because they want a due Quantity of Moisture, advises, That where the Soil is such, the *Walls* be built upon Arches, each Arch being four Feet wide, and the Piers between them two Feet apiece; the Top of the Arches to be as high as the Surface of the Border, and the *Wall* to face the South Sun; the Trees to be planted at twelve Feet Distance, which is one in every second Arch: and on the North Side of the same *Wall*, to plant other Fruit in the vacant Arches.

By this means, says he, the Peaches would have the Benefit of the Sun upon their Branches; and besides, they having the double Liberty of spreading their Roots, they would be partly shaded, and enjoy a due Share of the North Border, and Moisture to nourish them and their Fruit; and so by this means they would be preserved free from Cankers, and the Curling of their Leaves, which is commonly a Fore-runner of Death. *Vines* may be planted on the South-side between the Peaches.

As to those Trees that are planted on the North-side of the *Wall*, he supposes that they would be much assisted in their Vigour, by the Warmth of the Sun falling upon their Roots on the South-side of the Arches.

But as to this Manner of building of *Walls*, I do not approve of it; because,

1. If it be a *Party-wall* in a Garden, and be planted on both Sides, the Trees will run through, and rob one another of the Nourishment.

2. If it be an Outside *Wall*, there are commonly *Elms* planted at some small Distance, to break the Violence of the Winds, and the Roots of these *Elms* will more easily run thro' and rob the Trees of their Nourishment; but if there are not *Elms*, it is but seldom that there is as good Earth on the Outside of the Garden as there is within.

3. Because the worst Inconvenience will be, that it will entice the Roots of the Trees to run downright, which is a very great Fault in Fruit-trees.

4. The Roots will not be able to find much Nourishment under a *Brick-wall*, where neither Sun nor Rain can come to correct the Humidity of the Earth, and render it proper for the Nourishment of Fruit.

I have seen a Book, written by a *Fellow of the Royal Society*, for the further Improvement of Fruits, by building of *Walls* sloping, but I never have had any practical Experience of building such a *Wall*; but I am of Opinion, that a perpendicular *Wall* is preferable to any other, or one rather hanging a little inward over

over the Fruit, if it could be so conveniently contriv'd.

For when the Sun is low, either in the *Spring* or *Autumn*, or in the Evening or Morning, those *Walls* which lean sloping backwards, will have but a Glance, or but little of the Power of the Sun; but a perpendicular *Wall* has the Sun's Rays full against it, which is preferable to the greatest Heats of the Sun at *Midsummer*, upon a back-sloping *Wall*.

In *Autumn* the Sun is wanting to ripen *Winter* Pears, which should be kept dry, which against sloping *Walls* cannot, the Dews lying much longer on such than on those that are perpendicular; and besides, they are much more liable to Blights in the *Spring*, and are more expos'd to Eddy-winds on all Sides.

WALL-FLOWER; *vide* *Leucojum*.

WALNUT; *vide* *Nux juglans*.

WATER, is one of the most considerable Requisites belonging to a Garden; if a Garden be without it, it brings a certain Mortality upon whatsoever is planted. By Waterings the great Droughts in *Summer* are allay'd, which would infallibly burn up most Plants, had we not the Help of *Water* to qualify the excessive Heats: besides, as to noble Seats, the Beauty that *Water* will add, in making *Jet d'Eaux*, Canals, and Cascades, which are some of the noblest Ornaments of a Garden.

Sir *Isaac Newton* defines *Water* (when pure) to be a very fluid Salt, volatile and void of all Savour and Taste; and it seems to consist of small, hard, porous, spherical Particles, of equal Diameters, and equal specifick Gravities; and also that there are between them, Spaces so large, and rang'd in such a Manner, as to be pervious on all Sides.

Their *Smoothness* accounts for their sliding easily over the Surfaces of one another.

Their *Sphericity* keeps them from touching one another in more Points than one; and by both these, their Frictions in sliding over one another, is render'd the least possible.

The *Hardness* of them accounts for the *Incompressibility* of *Water*, when it is free from the Intermixture of Air.

The *Porosity* of *Water* is so very great, that there is at least forty times as much Space as Matter in it; for *Water* is nineteen times specifically lighter than Gold, and of consequence rarer in the same Proportion: But Gold will, by Pressure, let *Water* pass through its Pores, and therefore may be suppos'd to have (at least) more Pores than solid Parts.

Monf. *Le Clerc* says, there are these Things observable in *Water*, which Naturalists study to know and account for.

1. It is transparent; because, as some are of Opinion, it consists of flexible Particles, like Ropes, which are not so close as to leave no Pores, nor so entangled, but that there are right Lines enough to transmit the Light.

For since the Particles are not joined close together, and are in perpetual Motion, the very Particles of Light do easily pass through

their right Lines, unless the *Water* be very deep, or put into Motion by some outward Cause; then indeed the Transparency of *Water* is very much obstructed, and it looks of a cloudy, obscure Colour, as it is obvious to Sight in a rough Sea; for at such a Time the vehement Agitation of the *Water* disturbs their Pores, and spoils their Straitness.

2. *Water* is liquid, but capable of being fixed: *Water* seems to be liquid for the same Reason that other Bodies are so. For since the Particles of it are flexible like Ropes, and leave Pores between one another, which are fill'd with finer Matter, when this Matter is put into a vehement Commotion, the Particles are easily toss'd about every where; yet when the Motion of this restless Matter is restrain'd, as it is in *Winter*, then the *Water* congeals into Ice; whether this comes of Cold only, or there be, besides, nitrous Particles, which fall out of the Air at that Time, and with their Rigidity fix the watry ones.

3. It may be made *hot* or *cold*: The Particles of *Water* being, as has before been said, *Ice*, is soon dissolv'd by the Motion of those of Fire: For the Particles of Fire getting into the Pores of the Ice, do mightily shake the fine, flexible Particles of it, and restore them to their former Motion in a little Time.

But if this *Water* be set in cold Air, the fiery Particles will soon vanish, and the *Water* become as cold as before.

4. *Water* easily evaporates by the Heat of Fire or Air. This is because its Particles are quickly separated and got into Motion; so that the airy Particles easily carry those of the *Water* about with them.

5. It is heavy if compar'd with Air and some other Bodies, but much heavier than Air. It has been shewn by various Experiments, that the Gravity of the Air in the Place where we live, is to that of *Water*, as one to eight hundred, or something more; so that *Water* is eight hundred times heavier than Air. And for this Reason a Bladder, or any other thing fill'd with Air, can hardly be sunk under *Water*; and indeed, to make Air sink, there must be a Weight added to it, that shall exceed the Weight of the *Water* as much, and something more, than that of the *Water* exceeds that of the Air.

Hence it comes to pass, that *Water* easily supports Wood, and vast Ships fraught with the heaviest Cargo; for the Weight alone will never sink them, unless the Goods and Vessel together should make up a Weight which exceeds that of *Water*; and as salt *Water* is heavier than fresh, so it bears a greater Weight.

Those Things which are heavier than *Water*, as Stones, Metals, &c. when they are thrown into it, go strait down to the Bottom, and as their Weight is greater, by so much the quicker; while other Bodies which are of the same Weight with the *Water*, do neither float on the Surface, nor sink quite down, but remain suspended between the Top and Bottom, as is seen in the Carcasses of Animals.

6. *Water* is insipid, and without Smell. The Reason is, because its flexible Parts slip gently over the Tongue, and are not sharp enough to prick the Nerves and affect the Taste: But this is to be understood of pure *Water*, void of all Kind of Salt; such as distill'd *Water* is, and, next, that of Rain; for the most wholesome Fountain *Water* commonly derives a Saltiness from the Earth; tho' in this Place is not meant medicinal Fountain *Waters*, the Taste of which is more acute, but such *Water* as is usually drank.

And that it is without Smell: The purer any *Water* is, the less Smell it has; for the Reason why the Particles don't prick the Tongue, is the Reason why they don't affect the Smell: The Flexibility and Smoothness of *Water* is such, that they cannot pierce the olfactory Nerves: Some Fountain *Water* has indeed some Smell, but then it is a Sign that it is not pure.

7. *Water* is subject to putrify, according as the Place is where it is kept. *Water* will grow thick and stinking by Heat and Rest, as we find it does in Ponds and Marshes, and in close Vessels: But here it ought to be remember'd, that this is what was spoken of before, as such *Water* as is not pure; for unmix'd *Water* cannot putrify. This is prov'd, first, by distill'd *Water*, which may be kept very long without Putrefaction.

Secondly, in Rain *Water*, which is caught in clean Vessels, and presently stopp'd up close and buried under-ground, which is kept many Years, in Countries where they want Fountains: This shews that the Cause of Putrefaction is not in the *Water* itself, but in other Things that are mingled with it; because pure *Water*, such as is distill'd, or comes from the Clouds, keeps sweet for a great while; but then those Vessels in which such *Water* is kept, must be so well stopp'd, that the least Fly may not get into them, and they must be made of such Stuff as will not corrupt; such as Glass or Clay.

But as for standing *Water* in Ponds or Marshes, that is corrupted two Ways:

1. By the Nature of the Soil, which often abounds with noisome Sulphur, whereby the *Water* is impregnated, and comes to smell in warm Weather, as it does at *Amsterdam*, not only in the Canals, but where-ever the Ground is open'd for the Foundations of Houses. This Putrefaction is owing to the Soil, and not to the *Water*.

2. By the nasty Things that are thrown into it, or Bodies of Insects which die in it; as also by the Eggs of Flies, which are dropp'd about where-ever they go, and breed Worms. *Water* is corrupted in wooden Vessels, especially at Sea, by the sulphureous Parts of the Wood, and by uncleanly Things; as Flies, Eggs, &c.

Water penetrates the Pores of those Bodies, whose Pores are wide enough to receive its Particles: Thus it enters the Pores of Sugar and Salts, so as to separate and quite dissolve their Particles; but it cannot get into the Pores of Stones, or but a very little Way;

so that it only wets their Surface, without dilating them; hangs on the Outside of them, because they are rough, and because the Extremities of the Pores are open a little Way. But such Bodies, when they are wet, are soon dry'd in the Air, because the Motion of the airy Particles carries off the soft and smooth ones of the *Water*.

It is observable, that if Bodies rubb'd over with Oil or Fat, be dipp'd in *Water*, they get very little Wet, because the Roughness of their Surface, whereon the *Water* should hang, is smoothed, and made even by the Fat, and the Mouths of the Pores are closed up, so that there is nothing left for the watry Particles to hold by, and therefore they must needs slide off.

Dr. *Cheyne* observes, that the Quantity of *Water* on this Side our Globe does daily decrease, some Part thereof being every Day turned into animal, metalline, mineral, and vegetable Substances, which are not easily dissolv'd again into their component Parts; for if you separate a few Particles of any Fluid, and fasten them to a solid Body, or keep them asunder one from another, then they are no more fluid; for a considerable Number of such Particles are required to produce Fluidity.

Most Liquors are form'd by the Cohesion of Particles of different Figures, Magnitudes, Gravities, and attractive Powers, swimming in pure *Water*, or an aqueous Fluid, which seems to be the common Basis of all. And the only Reason why there are so many Sorts of *Water* differing from one another by different Properties, is, that the Corpuscles of Salts and Minerals, with which that Element is impregnated, are equally various.

Wine is only *Water* impregnated with Particles of Grapes, and *Beer* is *Water* impregnated with Particles of Barley, &c. All Spirits seem to be *Water* saturated with saline and sulphureous Particles.

And all Liquors are more or less fluid, according to the greater or smaller Cohesion of the Particles, which swim in the aqueous Fluid; and there is hardly any Fluid without this Cohesion of Particles, not even pure *Water* itself, as will appear from the Bubbles, which will sometimes stand on the Surface of it, as well as on that of Spirits and other Liquors.

Water contributes much to the Growth of Bodies, in that it both renders and keeps the active Principles fluid, so that they are capable of being convey'd by Circulation into the Pores.

The learned Dr. *Halley* has demonstrated, that if an Atom of *Water* be expanded into a Shell or Bubble, whose Diameter shall be ten times as great as before, such an Atom would be superficially lighter than the Air, and will rise so long as that *Flatus*, or warm Spirit, which at first separated or raised it from the Mass of *Water*, shall continue to distend it to the same Degree; but when that Warmth declines, and the Air grows cooler, and withal specifically lighter, these Vapours will stop at a certain Region of the Air, or else descend.

Therefore,

Therefore, if it should be suppos'd that the whole Earth were covered with *Water*, and that the Sun should make his diurnal Course round it, as now he does, he is of Opinion, that the Air would be impregnated with a certain Quantity of aqueous Vapours, which it would retain in it, like Salts dissolv'd in *Water*, and that the Sun in the Day-time warming the Air, that Part of the Atmosphere would sustain a greater Proportion of Vapours (as warm *Water* will hold more Salt in it dissolv'd than Cold), which by the Absence of the Vapours at Night would be discharg'd into Dews.

And in this Case he concludes, there could not be any Diversity of Weather, other than periodically every Year alike; the Mixture of all terrestrial, saline, and heterogeneous Vapours here being excluded, which he judges to be, when variously compounded and driven by Winds, which are the Causes of these various Seasons and Changes of Weather which we now find.

But instead of supposing an Earth to be cover'd all over with *Water*, you suppose the Sea interspers'd about wide and spacious Tracks of Land, and also divided by high Ridges of Mountains, such as the *Alps*, the *Apennine*, and the *Pyrenean* in *Europe*; the *Caucasus*, the *Imaus*, and the *Taurus* in *Asia*; the Mount *Atlas*, and the Mountains of the *Moon* in *Africa*; the *Aules* and *Apalatean* Mountains in *America*, each of which surpasses the usual Height to which the aqueous Vapours do of themselves ascend, and on the Tops of which the Air is so cold and rarefied, as to retain but a small Part of these Vapours, which are brought thither by the Winds.

Then the Vapours thus rais'd from the Sea, and carried by the Winds over the low Lands to those Ridges of Mountains, are there compell'd by the Steams of the Air, to mount with it up to their Tops, where the *Water* presently precipitates, gleeting down by the Crannies of the Stones; and part of the Vapours entring into the Caverns of the Hills, the *Water* thereof gathers, as in an Alembick, in the Basons of Stones; and these being once full, the Overplus of the *Water* runs down at the lowest Place of the Bason, and breaking out by the Sides of the Hills, forms single Springs; many of which run down by the Vallies or Guts between the Ridges of the Hills, and after uniting, form little Rivulets or Brooks; and many of these meeting again, form large Rivers.

Whether *Water* be originally a Fluid? It is a Point that has been controverted among Philosophers, whether Fluidity be the natural State of *Water*, or rather the Effect of Violence.

Sometimes we find it appear in a fluid Form, and sometimes in a solid one; and as the former is the more usual in our warmer Climate, we are apt to conclude Fluidity to be its proper State, and suppose the other to proceed from the extraneous Action of Cold. But the learned *Boerhaave* asserts the contrary, and

maintains, that *Water* is of the crystalline kind; because where-ever a certain Degree of Fire (Heat) is wanting to keep it in Fusion, it readily grows into a hard Glebe, which we call *Ice*.

Mr. *Boyle* is much of the same Opinion. He observes, that *Ice* is commonly reputed to be *Water*, brought into a præternatural State by Cold. But with Regard to the Nature of Things, and setting aside our arbitrary Ideas, it might as justly be said, that *Water* is *Ice*, præternaturally thaw'd by Heat. If it be urg'd, that *Ice* left to itself will, upon the freezing Agents being remov'd, return to *Water*, it may be answer'd, That not to mention the Snow and *Ice* that lie all the *Summer* long on the *Alps*, and other high Mountains even in the *Torrid Zone*, we have been assur'd, that in some Parts of *Siberia* the Surface of the Ground continues more Months of the Year frozen, by the natural Temperature of the Climate, than it has been thaw'd by the Heat of the Sun; and a little below the Surface of the Ground, the *Water* which chanches to be lodg'd in the Cavities there, continues in a State of *Ice* all the Year round; so that when in the Heat of *Summer* the Fields are cover'd with Corn, if you dig three or four Feet deep, you shall find *Ice*, and a frozen Soil.

Dr. *Boerhaave* is of Opinion, That if *Water* could be had alone and pure, it would have all the Requisites of an Element, and be as simple as Fire; but there has been no Expedient hitherto found out for making it such.

Rain *Water*, which seems to be the purest of all those we know of, is replete with infinite Exhalations of all Kinds, which it imbibes from the Air; so that though it be filter'd and distill'd ever so often, yet there still remains *Fæces*.

As for that Rain *Water* that is gather'd from the Roofs of Houses, it is a *Lixivium* of Tiles, Slate, or the like, impregnated with the Dungs and *Fæces* of Animals, Birds, &c. deposited thereon, and the Exhalations of numerous other Things.

As for that Rain *Water* that is collected in Cities, it must be saturated with the Smoak of a thousand Chimnies, and the various *Effluvia* of Numbers of Persons, &c. Besides that, there is Fire contain'd in all *Water*, as appears from its Fluidity, which is owing to Fire alone.

As what is in the Air necessarily mixes itself with *Water*, it hence appears impossible to have such a thing as pure *Water*. If it be percolated thro' Sand, or squeezed thro' Pumice, or pass'd thro' any other Body of the like Kind, there will always be Salt remaining: Nor can Distillation render it pure; since it leaves the Air therein, which abounds in Corpuscles of all Sorts.

The purest of all *Waters* we can any way arrive at, is that distill'd from Snow, gather'd in a clear, still, pinching Night, in some very high Place, taking none but the outer or superficial Part thereof. By a Number of repeated Distillations thereof, the greatest Part of

of the Earth and other *Faces* may be separated from it, and this is what we must be content to call *Pure Water*.

Mr. Boyle indeed relates, That a Friend of his, by distilling a Quantity of *Water* an hundred times, found at length that he had got six Tenths of the Quantity in Earth; whence he concludes, that the whole *Water*, by the further prosecuting the Operation, might be converted into Earth.

But it should be consider'd, that the *Water* cannot be removed or poured into a Vessel without the Mixture of some Dust with it; so neither can the Luting of the Vessel be distill'd without losing something every time: Therefore Dr. Boerhaave rather concludes, That the *Water* thus often distill'd, might acquire new Earth from the Dust floating in the Air, and the Instruments employ'd in the Operation.

That Author assures us, That after he had distill'd some very pure *Water* by a gentle Fire for the Space of four Months, it appear'd perfectly pure, and yet leaving it to rest in Vessels perfectly clos'd, it conceiv'd a certain kind of weedy Matter, somewhat like the *Stamina* of Plants, or the little Tufts of a Mucilage; and yet it is related, that Schottus saw *Water* in Kercher's *Musæum*, that had been kept in a Vessel hermetically sealed, upwards of fifty Years, and yet it still remain'd clear and pure, and stood to the same Height in the Vessel as at the first, without the least Sign of Sediment.

Dr. Boerhaave adds, That he is convinc'd no body ever saw a Drop of pure *Water*; that the utmost of its Purity known, only amounts to its being free from this and that Sort of Matter, and that it can never, for Instance, be quite depriv'd of its Salt; since Air will always accompany it, and that has always Salt.

Water seems to be diffus'd every where, and to be present in all Space where there is Matter. There is not a Body in all Nature but will yield *Water*. It is also asserted, that even Fire itself is not without *Water*. A single Grain of the most fiery Salt, which in a Moment's Time will penetrate through a Man's Hand, readily imbibes half its Weight of *Water*, and melts even in the driest Air imaginable. Thus Salt of Tartar, placed near the hottest Fire, will attract or imbibe *Water*, and by that means increase considerably its Weight in a small Time: So in the driest Summer's Day, a pewter Vessel with Ice in it, brought up from some cold subterraneous Place, into the hottest Room, will immediately be cover'd over with little Drops of *Water*, gather'd from the contiguous Air, and condens'd by the Coldness of the Ice.

Even dry Bodies do afford a plenteous Stock of *Water*. Dr. Boerhaave says, Oil of Vitriol being expos'd a long Time to a violent Fire, to separate all the *Water* from it, as much as possible, did afterwards, by only standing a few Minutes, contract fresh *Water*, so fast, as soon to afford it, as plenteously as at first.

And that Hartshorn that had been kept for forty Years, and was as hard and dry as any Metal, so that if struck against a Flint, it would yield Sparks of Fire; yet this very Hartshorn being put in a Glass Vessel and distill'd, afforded him one Eighth of its Quantity of *Water*. He adds, We have known Bones dead and dry'd twenty-five Years, and thus become almost as hard as Iron, which yet by Distillation afforded half their Weight of *Water*; and the hardest Stones ground and distill'd, do always discover a Portion thereof.

Mr. Boyle, by Distillation, found that Eels yielded some Oil, Spirit, and volatile Salt, besides the *Caput mortuum*; yet all these were so disproportionate to the *Water*, that they seem'd to have been nothing but that coagulated.

The same Author, from human Blood itself, as spirituous and elaborate a Liquor as it is reputed, did, by Distillation, out of seven Ounces and a half, draw near six of Phlegm, before ever any other of the Principles began to rise.

Vipers, though they are esteem'd hot in Operation, and will in a convenient Air survive for some Days the Loss of their Heads and Hearts, yet it is surprizing how great a Share of *Water* they yield by Distillation.

Some have been of the Opinion, that *Water* was the common Matter of all Bodies. And *Thales*, with some other Philosophers, have held, that all Things were made of *Water*; which Opinion, probably, had its Rise from the Writings of *Moses*, where he speaks of the Spirit of God moving upon the Face of the *Waters*.

But Mr. Boyle does not conceive the *Water* here mention'd by *Moses*, as the universal Matter, to be our elementary *Water*; since though we should suppose it to have been an agitated Congeries, consisting of a great Variety of seminal Principles, and of other Corpuscles fit to be subdu'd and fashion'd by them, it yet might be a Body fluid, like *Water*, in case the Corpuscles it was made up of were, by their Creator, made small enough, and put into such an actual Motion as might make them all roll and glide over one another.

However, Basil Valentine, Paracelsus, Van Helmont, Centivoglio, and others, have maintain'd on his Principles, that *Water* is the elemental Matter, or *Stamen* of all Things; and that it suffices for the Production of all Things: Which Helmont endeavours to prove from the following Experiment.

He burnt a Quantity of Earth in a Potter's Vessel, till such time as all the Oil it contain'd was quite consum'd; then mixing it up with *Water*, he drew out all the Salt: The Earth thus prepar'd, he put in an Earthen Pot, such as is us'd by Gardeners, and took Care that nothing but *Rain-water* could enter into the same: And yet a Willow being planted in this Earth, grew up to a considerable Height; whence he concluded, that *Water* was the only

Nutrimēt

Nutrient of the Vegetable Kind, as Vegetables are of the Animal.

The same Thing Mr. Boyle likewise argu'd from a similar Experiment; and the Whole is countenanc'd by Sir Isaac Newton, who observes, that *Water* standing a few Days in the open Air, yields a Tincture, which, like that of Malt, by standing longer, yields a Sediment and a Spirit; but before Putrefaction, is fit Nourishment for Animals and Vegetables.

But Dr. Woodward endeavours to shew, that they were both mistaken; by proving, that *Water* contains in it divers extraneous Corpuscles, and that some of these are the proper Matter of Nutrition, *Water* being found to afford so much the less Nourishment the more it is purify'd: Thus Mint planted in *Water*, purify'd by Distillation, will not grow so fast as if put in *Water* not distill'd; and if the *Water* be distill'd three or four times over, the Plant will scarce grow at all, or receive any Nourishment from it.

So that *Water*, as such, is not the proper Nutrient of Vegetables, but only the Vehicle thereof, which contains the nutritious Particles, and carries them along with it through all the Parts of the Plant; so that a *Water-Plant*, e. g. a *Water-Cress*, being put in a Glass Vessel full of *Water*, will be found to contain the more Salt and Oil.

In effect, *Water* nourishes the less, the more it is purg'd of its saponaceous Salts: In its pure State it may suffice to extend, or swell the Parts, but affords no new vegetable Matter.

Helmont, however, carries his System farther, and imagines that all Bodies may be converted into pure elementary *Water*. He affirms, that his Alkahest adequately resolves Plants, Animals and Minerals into one Liquor or more, according to their several internal Differences of Parts; and that the Alkahest being abstracted from these Liquors, in the same Weight, and with the same Virtues, as when it dissolved them, the Liquors may, by frequent Cohobations from Chalk, or some other proper Matter, be totally depriv'd of their seminal Endowments, and return at last to their first Matter, insipid *Water*.

It is certain, that from mix'd Bodies we can draw *Water*, *Oil*, *Spirit*, *Salt* and *Earth*. Now Spirits cannot be better represented than by *Alcohol* of Wine; which Helmont affirms, may be so united with *Water*, as to become *Water* itself.

Tho' Spirit of Wine exquisitely rectify'd seems of all Liquors the most free from *Water*, yet even this is by Helmont affirmed to be materially *Water*, under a sulphureous Disguise; for, according to him, in making Paracelsus's *Balsamus Samech* (which is nothing but *Sal Tartari* dulcify'd by distilling Spirit of Wine from it till the Salt be sufficiently saturated with its Sulphur, and till it suffers the Liquor to be drawn off as strong as it was poured on), when the Salt of Tartar from which it is distill'd, hath retain'd or depriv'd it of its sulphureous Parts of the Spirit of Wine, the rest, which is incomparably the greatest Part of the Liquor, will turn to Phlegm.

2. As to *Salts*, Salt of Tartar well calcin'd, being laid to liquify in Air, will deposite an Earth; and if it be then committed to Distillation, will yield a considerable Quantity of insipid *Water*; insomuch, that if it be urged with a vehement Fire, the Salt will almost all vanish, and nothing saline remain either in the *Water* or the *Earth*: Whence Helmont concluded, that all Salts might be converted into *Water*.

As to the Conversion of acid Salts into *Water*, Sea-Salt, recover'd from its own acid Spirit and Oil of Tartar, melts into *Water* as much as into Oil of Tartar.

Mr. Boyle tells us, That corrosive Spirits abound in *Water*; which may be observ'd by intangling and so fixing their saline Parts, as to make them corrode some proper Body; or else by mortifying them with some contrary Salt, which will turn them into Phlegm.

Lastly, *Oils* run in great measure into *Water*, and 'tis probable might be converted wholly into the same.

Of the Fluidity of Water.

Water, says Dr. Boerhaave, is fluid; but the Fluidity is not natural thereto; for naturally it is of the crystalline Kind, and accordingly where-ever a certain Degree of Fire is wanting, there we see the *Water* become Ice. That this Ice is the proper Effect of the Want of Heat, and not of any additional *Spicula* introduc'd into the *Water*, as Mariotte and others contend, is evident enough, were it only hence, that on this Supposition it could not penetrate the Substance of all Bodies, as we find it does, and even that of Metals.

This *Water*, in its State of Solution, never remains at rest, its Parts are in perpetual Motion; as was first discover'd by the French with the Help of Microscopes; and is farther confirm'd by this, that if a little Saffron be suspended in the Middle of a Vessel full of *Water*, the Saffron Colour will in a little Time form, as it were, a kind of Atmosphere around, and at length be diffus'd through the whole *Water*. Now this could no way be effected without a Motion of the watery Particles among each other. Add, that if you cast a Quantity of the driest Salt in the coldest Weather into *Water*, it will soon be dissolv'd; which argues the continual Motion of the Particles of that Element.

He adds, that he had more than once fill'd a large wide Vessel with *Water*, and narrowly watch'd it with a good Microscope, but could never perceive it without some Sort of undulatory Motion.

Water scarce ever continues two Moments exactly of the same Weight, but is always varying more or less, by reason of the Air and Fire contain'd in it. Thus, if you lay a Piece of pure limpid Ice in a nice Balance, you will never find it continue in Equilibrio. The Expansion of *Water* in Boiling, shews what Effect the different Degree of Fire has on the Gravity of *Water*.

This Uncertainty makes it difficult to fix the specifick Gravity of *Water*, in order to settle

its Degree of Purity : But this we may say in the general, that the purest *Water* we can procure, is that which weighs 880 times as much as Air.

However, neither have we any tolerable Standard for Air ; for *Water* being so much heavier than Air, the more *Water* is contain'd in Air, the heavier of course must it be, as, in effect, the principal Part of the Weight of the Atmosphere seems to arise from the *Water*.

Of all *Waters*, the purest is that which falls in Rain in a cold Season and a still Day ; and this we must be content to take for Elementary *Water*. The Rain *Water* in *Summer*, or when the Atmosphere is in Commotion, 'tis certain must contain infinite Kinds of heterogeneous Matter : Thus, if you gather the *Water* that falls after a Thunder-clap in a sultry *Summer's* Day, and let it stand and settle, you will find a real Salt sticking at the Bottom : But in *Winter*, especially when it freezes, the Exhalations are but few, so that the Rain falls without much Adulteration : And hence, what is thus gather'd in the Morning-time, is found of good Use in taking away Spots in the Face ; and that gather'd from Snow, against Inflammations of the Eye : Yet this Rain *Water*, with all its Purity, may be filter'd and distill'd a thousand times, and it will still leave some *Fæces* behind it : So that to procure the purest *Water* possible, a Man must look for it in a large spacious Plain in the *Winter*-time, when the Earth is cover'd with Snow, and its Pores lock'd up with Frost.

The next, in point of Purity, is Spring *Water* : This, according to Dr. Halley, is collected from the Air itself, which being saturated with *Water*, and coming to be condens'd by the Evening's Cold, is driven against the cold Tops of Mountains ; where being farther condens'd and collected, it gleets down or distills, much as in an Alembic. This *Water*, which before floated in the Atmosphere in Form of Vapours, being thus brought together, at first forms little Streams, several of which meeting together, form Rivulets, and these, at length, Rivers, as has been said before.

If such *Water* chances to flow over *Strata* or Beds, wherein there is Salt or Sulphur, or Vitriol or Iron, or Copper, or the like, the *Water* becomes medicinal ; but the Basis, it may still be observ'd, is Rain *Water*.

Spring *Water* becomes the better by running ; for during all its Course, it is depositing what heterogeneous Matters it contain'd : But while the River drives on its *Waters* in an uninterrupted Stream, all its Salts, with all the vegetable and animal Matters drain'd into it, either from Exhalations, or from the Ground it washes gradually, either sink to the Bottom, or are driven to the Shore.

But what *Water* descends from Springs on the Tops of Mountains, is generally pretty free from heterogeneous Bodies.

Of the Penetrability of Water.

Water is the most penetrable of all Bodies next after *Fire* : For which Reason, it is very

difficult to confine it ; infomuch, that a Vessel through which *Water* cannot pass, may retain any thing. Nor is it any Objection, that Syrups and Oils will sometimes pass through Vessels, which *Water* cannot pass ; for this is not owing to the greater Subtily or Penetration of their Particles ; but to this, that such Vessels are made of Wood wherein Resin abounds, to which Oils and Syrups are Menstruums ; so that dissolving the Resin, they make their Way through the Spaces left thereby : Whereas *Water*, as it does not act on Resin, is retain'd in these Vessels.

Water, however, does gradually make its Way through all Woods, and is only retainable in Glass and Metals ; nay, it was found by Experiment at Florence, that *Water* shut up in a spherical Vessel of Gold, and then pressed with a great Force, made its Way through the Pores even of Gold : So that the most permeable Body in Nature is permeable to *Water*.

Water is even more fluid than Air ; for we account a Body is more fluid than another, when its Parts will make their Way through smaller Pores. Now Air, 'tis known, will not pass through Leather, as is evident by covering an exhausted Receiver therewith ; but *Water* goes through it with Ease. Again, Air may be retain'd in a Bladder, whereas *Water* oozes through. In effect, 'tis found that *Water* will pass through Pores ten times smaller than Air will.

All that has been said of Air, with regard to the Composition of Bodies, holds much more of *Water*, as being both more penetrative and more ponderous. It enters the Composition therefore of all Bodies, both Vegetables, Animals and Fossils ; and has this Circumstance peculiar to it, that it is easily separable from any of the Bodies it unites withal ; which cannot be said of any other Body.

Fire, indeed, will penetrate more than *Water*, but then 'tis difficult to separate it again from the Bodies it is once fix'd in, as is evident in red Lead, &c.

This Property of *Water*, join'd with its Smoothness and Lubricity, renders it fit to serve as a Vehicle for the commodious and easy Conveyance of the nutritious Matter of all Bodies ; for in being so very fluid, and passing and repassing so readily, it never stops up the Pores, but leaves Room for the following *Water* to bring on a new Supply of nutritious Matter.

And yet the same *Water*, as little cohesive as it is, and as easily separated from moist Bodies, will cohere firmly with some others, and bind them together into the most solid Masses ; tho' it appears wonderful, that *Water*, which is almost an universal Dissolvent, should withal be a great Coagulator.

Thus *Water*, mix'd up with Earth or Ashes, gives them the utmost Firmness and Fixity : The Ashes, for Instance, of an Animal, well incorporated with pure *Water*, and made into a Paste, and this baked by a vehement Fire, grow into a Cupel, which shall bear the utmost Effort of the Refiner's Furnace. 'Tis an Effect upon

upon the glutinous Nature of *Water* alone that our Houses stand : For take the *Water* out of the Wood, and it becomes Ashes ; out of Tiles, and they become mere Dust.

Thus a little Clay dry'd in the Sun, becomes a Powder, which mix'd with *Water*, sticks together again, and may be fashion'd at Pleasure ; and this dry'd again by a gentle Fire, or in the Sun, and then bak'd in a Potter's Oven by an intense Fire, becomes little other than a Stone.

So the *Chinese* or *Japan* Earth, whereof our Porcelain Vessels are made, which hold all Liquors, and even melted Lead itself, is diluted and wrought up with *Water*. In effect, all the Stability and Firmness that is seen in the Universe, is owing to *Water* alone : Thus Stone would be an incoherent Sand, did not *Water* bind it together.

Thus, again, of a fat, gravelly Earth, wrought up with *Water*, and baked or burnt, we make Bricks, Tiles, and Earthen Vessels, of such exceeding Hardness and Closeness that *Water* can't pass through them. And these Bodies, though to Appearance perfectly dry and destitute of *Water*, yet, if they be pulveriz'd, and put in a Retort, and distill'd, yield an incredible Quantity of *Water* : Whence it appears, that the Particles of *Water* may be so diffus'd and dispers'd through Bodies, as to cohere with them, and give them Hardness (for the Particles of Sand would never stick together without *Water*), and yet may be fetch'd back again, and reduc'd to their former fluid State.

And the same holds of *Metals* ; for the Parings or Filings of Lead, Tin, or Antimony, &c. by Distillation, yield *Water* very plentifully, and the hardest Stones, Sea-Salt and Sulphur, Nitre, Vitriol, &c. are found to consist chiefly of *Water*, into which they resolve by the Force of Fire, and lose the Cohesion of their Parts. Thus, if you distil *Sal Geminae*, which is a very hard transparent Body, like Crystal, a good Quantity of *Water* will arise ; and then the Body, which before was transparent, becomes opaque, white, and friable.

The *Lapis Calcarius* or Lime-stone, being expos'd to the Fire, affords a prodigious Quantity of pure *Water*, and the more this *Water* is express'd, the more friable does it become ; wherein, in the lieu of the *Water* so expell'd, the Fire, in the Course of Calcination, enters, which is expell'd again in its turn, by pouring on cold *Water*. Lastly, of the *Water* and Calx temper'd together, arises a Mass scarce inferior, in point of Solidity, to the primitive Lime-stone : So that the *Lapis Calcarius* appears to be no more than living Earth, bound into a Consistence with *Water*.

From what has been said, it appears, that *Water* is the universal Gluten which binds together the Parts of all Bodies : And hence that Observation of *Centivoglio*, That Nature makes Diamonds of a *Water* well depurated and harden'd into a Mass.

4 That *Water* is not elastic, is evident hence, that it is incompressible, or incapable,

by any means, of being reduc'd into less Compass, tho' urged with the greatest Weight : Thus we learn from that famous Experiment made by Order of the Great Duke of *Tuscany* ; where a Quantity of *Water* being closely included in a hollow Ball of pure Gold, and thus laid in a Press with a prodigious Force thereon, the Ball not being able to assume a more copious Figure, to give more Room for the *Water*, and the *Water* being incapable of Condensation, rather than yield, it transfused through the Pores of the Metal ; so that the Ball was found wet all over on the Outside ; 'till at length, making a Cleft in the Gold, it spun out with great Vehemence : From which Circumstance, some have concluded, that it was elastick, but on weak Grounds ; the Impetus wherewith the *Water* darted out, being more probably owing to the elastick Force of the Gold, which communicated that Impression to the *Water*.

And hence we see the Reason why Blocks of Marble sometimes burst in cold *Water* ; and why a Vessel fill'd with *Water*, and afterwards by any means reduc'd to a less Compass, bursts, tho' the Vessels be ever so strong. This is observable in a Piece of Brass Cannon, which being fill'd with *Water*, and the Mouth exactly stopp'd, so as to prevent all Egress of *Water* ; if a cold Night happens sufficient to contract and constrict Bodies, the metallic Matter undergoing the common Fate, and the *Water* refusing to give Way, the Cannon is burst asunder with incredible Violence. Tho' others account for the Effect from this, that the included *Water* in freezing endeavours to expand itself, or possess more Room than it did before ; which being deny'd, it bursts through its Restraint.

Some bring an Argument for the Elasticity of *Water* hence, That hot *Water* takes up more Room than cold : But no legitimate Conclusion can be form'd from hence ; for in the hot *Water* there is a good Quantity of Fire contain'd, which interposing between the Particles of the *Water*, makes it extend to a greater Space, without any Expansion of Parts from its own Elasticity. This is evident hence, that if *Water* be once heated, there is no reducing it to its former Dimensions, but by letting it cool again ; which plainly shews, that the Expansion depends not on the Elasticity of Parts, but on the Presence of Fire. *Water* then, tho' incapable of Compression, or Condensation, may yet be rarefy'd by Heat, and contracted by Cold ; so that Fire may act on some Bodies that are not elastic.

It may be added, that a farther Degree of Cold, that is such a one as congeals *Water*, or turns it into Ice, does expand it. There are other Ways to manifest this Expansion of *Water* by freezing. Mr. Boyle having pour'd a proper Quantity of *Water* into a strong cylindrical Earthen Vessel, he expos'd it uncover'd, both to the open Air in frosty Nights, and the Operation of Snow and Salt, and found, that the Ice produc'd in both Cases, reach'd higher than the *Water* before it was froze, and expanded into Ice.

So

So if a concave Cylinder, made of any compact Matter, be tightly stopp'd at one End, and fill'd with *Water* at the other, and then that also be clos'd in the same manner; if this Pipe be suspended in the Air, sufficiently cold, the contain'd *Water* will be froze, and the Stopples at both Ends, or at least at one, will be thrown out, and a Rod of Ice appear thereat, in Continuation with the Tube.

A Stone-cutter complain'd to Mr. Boyle, that sometimes through the Negligence of the Servants, the Rain being suffer'd to soak into Marble, the violent Frosts coming on, would burst the Stones.

Another Tradesman complain'd, that even Implements made of Bell-metal, being carelessly expos'd to the Wet, have been broken and spoil'd by the *Water*; which having enter'd at the little Cavities of the Metal, was there afterwards froze and expanded into Ice: And *Cabeus* tells us, he saw a huge Vessel of exceeding hard Metal split asunder by congealed *Water*.

If it be ask'd, how a Body so light, fluid, volatile, and which so easy a Fire suffices to rarefy, should be so stubborn and incompressible? We see no other Cause to assign, but the Homogeneity of its Parts.

If *Water* be consider'd as consisting of spherical or cubical Particles, hollow within-side, and of a firm Texture, here will be enough to account for the Whole. Its Firmness and Similarity will make it rest sufficiently, and its Vacuity renders it light enough, &c.

From what has been said, we may settle something as to the Nature of the component Particles of *Water*.

1. The Particles whereof *Water* consists, are, as to our Senses, infinitely small, as it appears from their prodigious penetrative Power.

2. They are exceedingly smooth and slippery, void of any sensible Asperities; as appears from their being so easily separable from other Bodies they adhere to.

3. They are extremely solid; as appears by their cohering with other Bodies into a solid Form.

4. They are perfectly transparent, and, as such, invisible. This we gather, 1. From hence, That pure *Water* inclos'd in a clean Vessel, hermetically sealed, projects no Shadow; so that the Eye shall not be able to discover whether the Vessel have *Water* in it or not. 2. In that the Crystal of Salts, when the *Water* is separated from them, lose their Transparency.

5. They are very rigid, and inflexible; as appears from their not being compressible. *Des Cartes* supposed the Particles of *Water* of an Eel-like Form, to account for their Lubricity: But, on this Footing, they could not be incompressible.

It is observ'd, that when Salt is infus'd in *Water*, it does not fill the Vessel in Proportion to its own Bulk; whence it follows, that there must be some little Spaces between its Particles to admit those of the Salt. And hence again we gather, that the watery Particles are solid

and inflexible; since tho' they have intermediate Spaces, yet no Force or Weight can any way compress or crowd them nearer together.

From the Whole it follows, that *Water* devoid of any heterogeneous Admixture, consists of exceedingly minute, penetrative, fluid, slippery, solid, ponderous Particles, and consequently approaches near to the Nature of *Mercury*: And hence that Observation of the antient Chymists; *That Mercury is the only Body in Nature that dissolves*; alluding to the menstruous Virtue of *Water*.

Water is the most insipid of all Bodies; for the Taste we sometimes observe therein, does not arise from the mere *Water*, but from Salt, Vitriol, or other Bodies mix'd with it; and accordingly, all the *Waters* that are savoury, as those of *Italy*, &c. and which are recommended by Physicians for medicinal Uses, are always found to deposit a Quantity of some of these Fossils.

Nor does it appear by any Experiment, that *Water* has the least Smell, provided it be pure; so that *Water* might remain imperceptible to us, were it not for our Sense of Touching.

Water therefore appears to be perfectly indifferent, as to the assuming of all Forms. *Centivoglio* maintains, That if it happens to fall in a Place where there is, *ex. gr.* pure Cinnabar, or any other Matter, the *Water* will join with them all, and become what they are. Which Opinion falls in with that of *Tales* and *Paracelsus* above-mention'd. And hence it is that *Water* is call'd a second *Mercury*.

Of the solutive Power of Water.

Water consider'd as a Menstruum, dissolves,

1. All Salts, as Sugar, Borax, &c. which Air only dissolves by virtue of the *Water* it contains; which Fire only liquefies, and Earth leaves untouch'd: So that *Water* alone is the proper Menstruum of Salts.

The Particles of Salts, as it has been observ'd, can insinuate themselves into the Interstices between the Particles of *Water*; but when those Interstices are fill'd with any Salt, the same *Water* will not any longer dissolve the same Salt; but a Salt of another kind it will, by reason its Particles being of a different Form, will enter and occupy the Vacancies left by the former. And thus again, it will dissolve a third or fourth Salt, &c. So when *Water* has imbib'd its Fill of common Salt, it will still dissolve Nitre; and when saturated with Heat, it will dissolve *Sal Armoniac*; and so on.

2. It dissolves all saline Bodies; it being the constituent Quality of a saline Body to be unflammable and dissoluble in *Water*. Hence *Water* may dissolve all Bodies, even the heaviest and most compact, as Metals, inasmuch as these are capable of being reduc'd into a saline Form; for these may be so intimately dissolv'd by *Water*, as to be sustained therein.

3. It

3. It dissolves all saponaceous Bodies, *i. e.* all alkalious Salts and Oils blended together: Those two Bodies make a *Sapa*, which is a saline Body, but not a Salt. Now Oil itself is not dissoluble in *Water*, but the Admixture of the Salt here, rendering it saline, *Water* readily dissolves it.

All the Humours in the human Body are apparently saline, tho' none of them are Salt itself. The same may be said of the Juices of all Vegetables, excepting the Oils, which accordingly dissolve in *Water*.

Salts are the active Instruments of Nature, and yet those do not act, unless dissolv'd either by *Water* or *Fire*.

A Crystal is a Glebe of Salt, or Metal, or both together. If now you take Sea-Salt well dry'd, it will be white, and not transparent; dissolve it in *Water*, and after exhaling the *Water*, it will become transparent, by reason of the *Water* interpos'd between its Parts.

4. It dissolves *Glass* itself; for this, if melted with Salt of Tartar, becomes soluble in *Water*.

5. It dissolves all gummous Bodies; this being Part of the Definition of a Gum, that it dissolves in *Water*, in Contradistinction from a Resin; but oleaginous Bodies it leaves untouched, nay, and what is more extraordinary, it repels them; and by repelling, drives the oily Particles into Eddies.

If an hundred Drops of Oil be thrown upon *Water*, all the several Drops, which before were perfectly dispersed, will soon gather together again, and leave the *Water* alone: So that there should seem to be some Repugnance between *Water* and Oil, and some Attraction between the Particles of *Water*, as also between those of Oil.

Add, that *Water* seems to repel all oleaginous, fatty, and adipose Bodies wherein Oil predominates; and hence also it is, that the fatty Parts in our Bodies escape being dissolv'd by *Water*: And it is, in all Probability, by this means that Fat is collected in the adipose Cells of all Animals.

Nor does *Water* dissolve *Sulphur*; for tho' you boil *Sulphur* ever so long in *Water*, yet it will still remain untouched.

Nor does it dissolve *terrene* or *earthy* Bodies, but rather unites and consolidates them; as we see in Tiles, &c.

Water however mix'd with Alkali Salts, dissolves Oil and oily Bodies: Thus, though mere *Water* pour'd on greasy Wooll, be repell'd thereby, and contributes nothing towards cleansing of the same; yet mix a strong Lixivium or an Alkali Salt with the *Water*, and then it readily dissolves, and absorbs all that is greasy and oleaginous; and thus it is Woollen Cloths are scoured. But neither will *Water* alone do, as being immiscible with Oil, nor will any other sort of Salts; for *Sea-water*, with all its Salts, will never wash out any oily Impurities. So in the ordinary Methods of Scouring and Fulling, the Stuffs are wash'd in stale, putrefy'd, human Urine, which is known to be a thorough Alkali.

Lastly, it does not dissolve *Resins*; as we conceive a Resin to be no other than an inspissated or concentrated Oil.

It has been disputed, whether or no *Water* be convertible into Air, there being numerous Instances of at least an apparent Transmutation.

In the Vapours daily rais'd, we find *Water* rarefy'd to such a Degree, as to take Place in the Atmosphere, and help to compose a considerable Part of what we call *Air*, and even to contribute to many of the Effects ascrib'd to *Air*.

But such a Vapour has not the Character of true, permanent *Air*, being easily reduc'd into *Water* again. So in Digestions and Distillations, tho' *Water* may be rarefy'd into Vapours, yet it is not really chang'd into *Air*, but only divided by Heat, and diffus'd into very minute Parts; which meeting together, presently return to such *Water* as they constituted before.

Yet *Water* rarefy'd into Vapour in an *Æoli-pyle*, will, for a while, have an elastic Power, the great and last Characteristick of true *Air*, and stream out perfectly like a Blast of *Air*. The elastic Power of this Stream is manifestly owing to nothing else but the Heat, that expands and agitates the aqueous Particles thereof; and when the Heat is gone, the Elasticity, and other aerial Properties disappear.

Rapid Winds thus made, seem to be no more than mere *Water* broke into little Parts, and put into Motion; since by holding a solid, smooth, and cold Body against it, the Vapours condensing thereon, will presently cover the Body with *Water*.

Indeed, tho' no Heat intervenes, Motion alone, if vehement, may, perhaps, suffice to break *Water* into minute Parts, and make them ascend upwards in form of *Air*.

Mr. Boyle observes, that between Lyons and Geneva, where the *Rhone* is suddenly straiten'd by two Rocks very near each other, that rapid Stream dashing with great Impetuosity against them, breaks part of its *Water* into minute Corpuscles, and gives it such a Motion, that a Mist may be observ'd at a considerable Distance arising from the Place, and ascending high into the Air.

Sea-water is an Assemblage of Bodies, wherein *Water* can scarce be said to have the principal Part; 'tis an universal Colluvies of all the Bodies in Nature, sustain'd and kept swimming in *Water* as a Vehicle.

Dr. Lister considers it as the Fund or Source out of which all Bodies arise. He gives, in some measure, into the Opinion of *Thales* and *Van Helmont*; and imagines the *Sea-water* to have been the only Element created at the Beginning, before any Animal or Vegetable; or even before the Sun himself.

Fresh-water, he supposes, to have arose accidentally after the Creation of these, and to owe its Origin to the Vapours of Plants, the Breath of Animals, and the Exhalations raised by the Sun.

Dr. Halley is of another Opinion: He supposes, that the Saltiness of the Sea arises from

the saline Matter dissolved and imbibed by the Rivers in their Progress, and discharged with their *Waters* into the Ocean; and consequently that the Degree of Saltiness is continually and gradually increasing.

On this Hypothesis he even proposes a Method for determining the Age of the World: For two Experiments of the Degree of Saltiness, made at a large Interval of Time, will, by the Rule of Proportion, give the Time, wherein it has been acquiring its present Degree of Saltiness. *Philos. Transf.* No. 344.

Without *Water* there can no Fermentation be raised.

Thus, if you grind a Plant into Dust and *Farina*, it will never ferment, even tho' you add Yeast or Spirit of Wine thereto; but *Water* being poured on it, the Fermentation readily rises.

All Putrefactions both of animal and vegetable Bodies are likewise perform'd by means of *Water* alone; and without it there would be no such Effect in all Nature.

Water is of great Service in directing and determining the Degree of Fire or Heat. This was first discovered by M. Amontons, from an Observation that *Water* over the Fire grows gradually more and more hot, till it comes to boil; but then ceases to increase, and only maintains its present Degree of Heat, even tho' the Fire was ever so much enlarg'd, or was continued ever so long. This therefore affords a Standard or fix'd Degree of Heat all over the World; boiling *Water*, provided it be equally pure, being of the same Heat in *Greenland* as under the *Equator*.

Mineral Waters are of several Kinds:

1. *Acid Waters*: These arise from the Admixture of Vitriol, Nitre, Allum, and Salt. These are cold, and very frequent, there being reckon'd not less than a thousand in *Germany* alone: Some of which are four as Vinegar, and used instead thereof; others vinous, and serving for Wine; others astringent, &c.

Hot-waters arise from the Admixture of sulphureous Particles and Fumes: Of these, the hottest is said to be that of *Japan*, which no Fire can bring *Water* to equab, and which keeps hot thrice as long as our boil'd *Water*.

Oily and fat Waters arise from bituminous and sulphureous Matter, as Amber, Petroleum, Pitch, Naphtha, &c.

Bitter Waters are produced from an impure Sulphur, Nitre, and Copper: Such is the *Lacus Asphaltites*.

Very cold Waters have their Rise from a Mixture of Nitre and Allum; or of Mercury, Iron, &c. The Depth of the Source or Spring too has some Effect.

There are also divers *Waters* which change the Nature of Bodies.

In the northern Part of *Ulster* in *Ireland* is reported to be a Spring, which in the Space of seven Years petrifies Wood, or converts it into Stone. The like are said to be found in divers other Parts, as in *Hungary*, *Burgundy*, &c. *Vitruvius* mentions a Lake in *Cappadocia*, which converts Wood into Stone in one Day.

Near *Armogh* in *Ireland*, is said to be a Lake, wherein a Staff being fix'd some Months, the Part that stuck in the Mud will be turned into Iron, and that Part encompass'd with the *Water*, into Hone, the rest remaining as before.

There are *Waters* suppos'd to transmute Iron into Copper.

Poisonous Waters are occasioned by their creeping thro' arsenical, antimonial, or mercurial Earths, and being impregnated by their Fumes; such as the *Lacus Asphaltites*, and divers others about the *Alps*, &c. which immediately kill those who drink: But these are most of them fill'd up with Stones, which is one Reason so few are known.

Saline Waters are generated two Ways; either they are derived from the Sea by some subterraneous Passage, or are generated from Mineral Salts, which they meet withal in their Passage ere they arrive at their Springs.

Boiling or Bubbling Waters are produc'd either by a sulphureous, or a nitrous Spirit mix'd with the *Water* in the Earth: If it be sulphureous, the *Water* is hot; if nitrous, cold: For all the *Waters* that boil as if hot, are not so, but some few are cold.

There are divers other *Waters* that have singular Properties, not reducible to any of these Classes; such,

1. Is that Spring in *Portugal*, which absorbs all Bodies cast into it, although the lightest: And not far from it there was anciently another, in which no Bodies, not the heaviest, could sink.

2. There is said to be a Lake in *Andalusia* which foretels approaching Storms, by making a terrible Bellowing, that may be heard at eighteen or twenty Miles Distance.

3. In *Granada* is a Well, whose *Water* dissolves Stones.

4. There are Springs in divers Parts of *England* and *Wales*, *Spain*, &c. which ebb and flow daily with the Flux and Reflux of the Sea; and some are said even to ebb and flow against the Tide.

M. Mariotte, in his Treatise of *Hydrostatics*, tells us, That there is in *Water* a kind of Viscousness, which makes its Parts stick to one another, and to other Bodies, as to Wood, and clean Glass, in such a manner, that a large Drop of *Water* will hang upon the Wood or Glass without falling; and if you pour *Water* into a clean Glass, without filling it, that Part of the *Water* which is next to the Glass will rise above a Line and a half higher than the Level of the rest. And tho' we cannot tell wherein this Viscousness consists, yet its Effects are always sensible.

After this manner, two distinct Drops of *Water* will unite into one as soon as they touch one another ever so little.

The same Thing will happen to two Drops of *Mercury*, or two Drops of Oil laid softly upon *Water*, if you bring them to touch one another. The same will also happen to those Bubbles of Air which are at the Bottom of a Dish full of *Water*, when it has stood a while upon the Fire; for if you push them towards each other, with a Pin or any thing else, they will,

will, after the same manner, run into one another.

To explain the Reason of this Viscousness, as well as we can, we might say, that each of these Substances having their Particles in constant Motion, the Particles of each kind have a Figure proper to hook and unite themselves to those of the same kind, and that they fasten to each other as soon as by their Motion they come to touch.

There is another Conjecture, *viz.* That the Air having a strong Spring, endeavours to reduce those fluid Bodies to the least Space they can take up, which is a spherical Figure: But if this was true, then a Drop of *Mercury*, and a Drop of *Water* would be reduced into a Globe. Besides we find, that in the exhausted Receiver of an Air-pump, Drops of *Water* or *Mercury* keep their globular Figures, and unite into one in that rarefy'd Air, as they do in common Air.

There are also Bodies that *Water* will not stick to, or not without Difficulty, as Tallow, Colewort-Leaves, before they are handled, Swan or Duck Feathers; if it lies upon those Substances, it is in round Drops; or if it be in a pretty large Quantity, its Out-side is round, and the rest is a level Surface.

WEATHER is the State or Disposition of the Atmosphere, with regard to Moisture or Drought, Heat or Cold, Wind or Calm, Rain, Hail, Frost, Snow, Fog, &c.

As 'tis in the Atmosphere that all Plants and Animals live and breathe; and as that appears to be the great Principle of most animal and vegetable Productions, Alterations, &c. there does not seem any thing in all Philosophy of more immediate Concernment to us than the State of the *Weather*.

In effect, all living Things are only Assemblages or Bundles of Vessels, whose Juices are kept in Motion by the Pressure of the Atmosphere, and which by that Motion maintain Life: So that any Alterations in the State of the Rarety or Density, the Heat, Purity, &c. of the Atmosphere, must necessarily be attended with proportional ones with these: Almost every Body knows, what vast, yet regular Alterations a little Change of *Weather* makes in a Tube fill'd with *Mercury* or Spirit of Wine, by *Barometers*, *Thermometers*, *Hygroscoopes*, &c. and we should not fail to feel as great and as regular Alterations in the Tubes, Chords and Fibres of our own Bodies, were it not partly for our Inattention, and partly for our unequal and intemperate Course of living.

The Knowledge of the *Weather* is of great Service in *Gardening* and *Agriculture*; but the imaginary Prognostications of Almanack Writers have been found to be a mere delusive Cant and Jargon. There is nothing more wanting than a just Theory of the *Weather* on Mechanical Principles.

Were Registers carefully kept in divers Parts of the Globe for a good Series of Years, we might by them be enabled to determine the

Directions, Breadth and Bounds of the Winds, and of the *Weather* they bring with them; the Correspondence between the *Weather* in divers Places, and Dependence between one Sort and another at the same Place: And thence we might in time learn to foretel divers great Emergencies; as extraordinary Heats, Rains, Frosts, Droughts, Dearth, &c. But in order to this, a compleat History of the *Weather* will be required.

Indeed there have been some Essays made this Way by the Members of our *Royal Society*, the *French Academy of Sciences*, and divers other Persons of Note; but the Driness of the Subject has put a Stop to their Progress in that Matter.

As for Instance, *Eras. Baribolinus* has Observations of the *Weather* every Day throughout the Year 1671. And Mr. *Werle* made the like at *Oxford* for seven Years, from the Year 1337 to 1343. Dr. *Plot* did the same at the same Place for the Year 1684. Mr. *Hiller* at *Cape Corse* for the Years 1686 and 1687. And Mr. *Hunt*, &c. at *Gresham College* for the Years 1695, 1696. Mr. *Derbam* at *Upminster* in *Essex* for the Years 1691, 1692, 1697, 1698, 1699, 1703, 1704, 1705. Mr. *Townly* in *Lancashire* for the Years 1697, 1698. Mr. *Cunningham* at *Emin* in *China* for the Years 1698, 1699, 1700, 1701. Mr. *Lock* at *Oats* in *Essex* 1692. Dr. *Scheuchzer* at *Zurich* in 1708. And Dr. *Tilly* at *Pisa* the same Year.

The most certain Signs and Prognosticks of good and bad *Weather* may be collected from those Things that are nearer to us than the Orbs of the Planets; nor need we go any farther than this our sublunary World for the most probable Conjectures in relation to the *Weather*, and may deduce our Prognostications in relation thereto, from *Animals* and *Vegetables*, &c.

It is certain, that a great Part of the Brute Creation have a Sensibility and Sagacity this Way beyond Mankind, and that without any Means or Disposition thereto, more than we; except that their Vessels, Fibres, &c. being in other respects in one equable Habitude: The same, or a proportionable Cause from without, has always a like or proportionable Effect on them; that is, their Vessels are regular *Barometers*, &c. affected only from one external Principle, *viz.* the Disposition of the Atmosphere: Whereas ours are acted on by divers from within, as well as without; some of which check, impede, and prevent the Action of others.

Animals that live in the open Air must necessarily be supposed to have a quicker Sense of it than Men that live Within-doors; and especially the Airy Inhabitants, the *Birds*, who live in the freest and clearest Air, and are more apt, by their Flight and other Motions, as well as their Voices, to discover their Sensations of it.

Therefore those who have apply'd themselves to the Observations of the Signs and Prognosticks of good or bad *Weather*, have laid down these following Rules.

Signs

Signs or Prognostications of Rainy Weather.

The Lord Bacon says, That Water-Fowls, such as *Sea-Gulls*, *Moor-Hens*, &c. when they flock and fly together from the Sea towards the Shore, foretel Rain and Wind.

And on the other hand, when Land-Birds, such as *Crows*, *Swallows*, &c. fly from Land to the Waters, and beat the Waters with their Wings, it betokens Rain and Wind.

The natural Reason of that seems to be, the Pleasure that both Land and Water-Fowl take in the Moistness and Density of the Air, and to love to be in Motion and upon the Wing.

It is no strange Thing, that Water-Fowls delight in that Air which is most like Water, their natural Element; and that Land-Fowl also (many of them) delight in Bathing, and moist Air.

And also for the same Reason, many Birds prune their Feathers; *Geese* gaggle, and the *Crows* call for Rain: All which seems to be but the Pleasure they take in the Relaxation of the Air.

The *Heron*, which is a Water-Fowl, delights in a condens'd Air: And besides, being a Fowl of a heavy Wing, requires the Assistance of the grosser Air; and therefore where the Air is gross, and thickens into Showers, she flies low.

When *Crows* flock together in large Flights, and hold their Heads upwards as they fly, and cry louder than they usually do, it is a Sign of Rain; and when they walk stalking by Rivers and Ponds, it is the same.

When *Swallows* chatter and fly low about Lakes and Ponds, (which they do, in order to catch Flies; for the Air being clogg'd with Vapours, hinders the Flies from ascending) it bespeaks Rain.

When *Peacocks* cry much; when Birds that usually perch upon Trees, fly to their Nests; when Fowls pick up their Feathers with their Bills; when *Cocks* crow before their usual Hour, and *Hens* creep in Clusters into the Dust, they are Signs of rainy Weather.

Not only Birds, but Beasts do give Notice of Rain, as *Sheep*, when they leap mightily, and push at one another with their Heads, it denotes Rain.

When *Asses* bray or shake their Ears, or are annoy'd with Flies; when *Deers* fight; when *Foxes* and *Wolves* howl mightily; when *Hogs* at Play break or scatter their Food; and *Oxen* that are ty'd together, raise their Heads, and lick their Snouts, it is a Sign of Rain.

When *Cattle* leave off feeding, and make Haste to shelter under Bushes and Hedges, &c. when *Cats* rub their Heads with their Fore-paws (especially that Part of their Heads which is above their Ears) and lick their Bodies with their Tongues, it is a Sign of Rain.

Beasts do generally delight in a moist Air, and it causes them to eat their Meat the better. *Cattle*, *Deer* and *Rabbits* will feed heartily before Rain. *Heifers* will put up their Noses,

and snuff in the Air against Rain. *Sheep* will rise early in a Morning to feed against Rain.

Also *Fishes*, either *Sea* or *River-Fish* do often, by their playing towards the Top of the Waters, foretel Rain. For this, the Lord Bacon gives this Reason, That when the Weather is dry, the *Fish* love to keep as much as they can from the Air, and swim lower, and will not come near the Air till it is moist.

Insects and *Reptiles* do also give Prognosticks of Rain.

Ants quit their Labour, and hide themselves in the Ground against Rain: For these provident *Insects*, by a secret Instinct in Nature, carry their Eggs to a Place of drier Security, when they find the Air chang'd into Moistness, and clogg'd with Vapours.

Bees, when Rain is coming on, do not stir from their Hives, or at least not far.

Fleas bite more against Rain, and *Flies* are very troublesome, often dashing against Person's Faces.

Moles will cast up more Earth; and *Earthworms* will creep out of the Ground against Rain.

Even the Bodies of Men and Women give Tokens of Rain or Frost, by Aches, Corns and Wounds, which will be more troublesome against such Seasons: For Rain makes the Humours of the Body to abound more, and Frost makes them sharper.

Mr. Ozanam says, That the very Body of all Animals and Vegetables, is (as it were) a Contexture of Barometers, Hygrometers and Thermometers, for the Humours with which organiz'd Bodies are replenish'd, increase or decrease, according to the different Dispositions of the Air.

Prognosticks of the Weather from Vegetables.

Mr. Pointer tells us, He has observ'd, that many, if not most Vegetables do expand their Flowers and Down in Sun-shiny Weather, and towards the Evening, and against Rain, close them again, especially at the Beginning of their Flowering, when their Leaves are young and tender.

This is evident in the Down of *Dandelion* and other Downs, and evidently in the Flowers of *Pimpernel*, the Opening and Shutting of which (he says) are the Countryman's Weather-wiser.

And Mr. Gerard says, if the Flowers be close shut, it betokens Rain and Foul-weather; but if they be spread abroad, Fair-weather.

The Lord Bacon says, *Trefoil* swells in the Stalk against Rain, and so stands more upright; for by Wet, Stalks do erect, and Leaves bow down: And *Pliny* says much to the same Purpose.

The former says likewise, That there is in the Stubble-Fields a small red Flower, which Country People call the *Wincopipe*, which if it opens in the Morning, you may be sure of a fair Day to follow.

Mr. Ozanam gives as a natural Reason for this, that Plants are a sort of natural Hygrometers, which are compos'd of an infinite Number

ber of Fibres, *Tracheæ* or Air-Vessels, which are like so many Canals or Pipes, thro' which the Moisture of the Air, as well as the Juice of the Earth, is conveyed into all its Parts.

These *Tracheæ* or Air-Vessels are visible, and appear very pretty in the Leaf of the *Scabious* or the *Vine*; if you pull asunder some of its principal Ribs, you may see between them the Spiral Air-Vessels (like Threads or Cobwebs) a little uncoil'd.

Signs of Rainy Weather by solid Bodies.

The hardest and most solid Wood will swell by the Moisture of the Air: This is evident by the Difficulty of shutting Doors and Windows in wet *Weather*, and Boxes, especially of Deal; and Pegs of Wood, when they draw and wind hard, are Signs of wet *Weather*: And this is caused by the Admission of the Air through the Pores of the Wood.

Mr. Ozanam says, The moist Vapours do readily insinuate into Wood, especially that which is light and dry, it being extremely porous; so that they are sometimes made use of in dilating and breaking the hardest Bodies, and in particular *Mill-stones*: For when they have cut a Rock into a Cylinder, they divide that into several lesser Cylinder's, by making several Holes round the great Cylinder, at proportional Distances, according to the Thicknesses they design the *Mill-stones*, and then fill them with as many Pieces of *Sallow-wood* dry'd in an Oven; for when the wet *Weather* comes, these Wedges or Pieces of Wood become so impregnated with the moist Corpuscles of the Air, that they swell and break, or separate the cylindrical Rock into several Stones.

And *Stones*, especially *Marble*, will sweat against wet *Weather*, though it be but from an outward Cause, in that the Stones are so hard and solid, as not to admit the Moisture of the Air, and therefore it only lies upon the Superficies of the Stones.

And the Humidity of the Air insinuates itself into the hardest Bodies, which are not destitute of Pores, and especially into light Bodies that take up a great Space.

Signs of Rainy Weather from the Planets and Stars.

By the *Sun*. If the *Sun*, at his Rising, looks red, and broader than usual, then many moist Vapours are gathering from the Sea, and the Air is thickening, and the Beams of the *Sun* being diffus'd in it, causes the *Sun's* Face to shew a great deal bigger than is usual; and, in a short Time, you will perceive the Clouds mustering and over-spreading the Heavens, and the Air condensing into a watery Body.

If this happens in *Summer* or *Autumn*, when the *Weather* is hot, the Showers that fall will be violent, but of short Continuance; but if this happens in the *Winter* or *Spring*, it denotes settled Rains, but more moderate.

It has been an Observation, confirm'd by long Experience, That if the *Sun* rises with a

bluish Circle inclining to *White*, the Air is gross and condens'd, and Rain will soon fall.

And if when the *Sun* rises, he is pale, and the Sky is of a dusky *Red* in the Morning, it will soon be overcast, and there must quickly follow Rain, attended with whisking Winds.

Also if the *Sun* rises of a misty, muddy Colour, or in a black Cloud, and diffuses his Rays palish towards the North and South, it foretels Rain.

It has been an Observation, That if the *Sun* sets under a thick Cloud, Rain will fall the next Day; or if it rains immediately, there will be a great deal of Wind the next Day: And this is almost the constant Consequence of a pale setting *Sun*.

Tho' a red Sky at the *Sun*-rising is a Sign of Rain, yet a red Sky, when the *Sun* sets, is a Sign of fair *Weather*: Tho', indeed, if the Sky be red at a great Distance, from the Part where the *Sun* sets, as in the East, there will be either Rain or Wind the next Day.

As to the *Moon*. A pale *Moon* is a Fore-runner of Rain; a red one of Wind, and a clear one of fine *Weather*.

When the *Moon* is encompass'd with a very large Circle, or is dim and misty, then there will follow Wind, Rain or Snow very quickly, probably within twenty-four Hours.

If the Horns of the *Moon* at her first Rising, or within two or three Days after her Change, are blunt, it betokens rainy *Weather* for that Quarter, but seasonable *Weather* the other Quarter.

An *Iris* round the *Moon* is also a Sign of Rain, with a South Wind.

Two or three discontinued and speckled Circles or Rings round the *Moon* bespeak a Storm.

Signs of Rainy Weather by the Stars.

When the *Stars* seem bigger than usual, pale, dull, and do not twinkle, it is a Sign that the Air is condensing to Rain, that will soon fall.

When in *Summer*-time the *Stars* appear brighter and more blazing than ordinary, it bespeaks great Winds and Rain.

When many *Stars* appear in the Night, and seem more numerous than usual, and in *Summer*-time the Wind be East, it denotes sudden Rain.

Signs of Rainy Weather from the Clouds.

If in an Evening there appear many small Clouds from the West, it shews that Rain is gathering, and will soon fall.

When Clouds appear like Rocks or Towers, they signify great Showers.

Mr. Ozanam says, That when we see little, black, loose Clouds, wandering to and fro, lower than the rest, we apprehend a future Storm; and when at the rising of the *Sun* several Clouds are seen to gather in the West; and on the other hand, if these Clouds disperse, it bespeaks fair *Weather*.

When the *Sun* through the Clouds appears double or triple, it shews a Storm of long Duration.

Signs of Rain from the Rainbow.

If the *Rainbow* appears very big, it denotes much Wet; but if very red, Wind withal.

If a *Rainbow* appears after a long Drought, it signifies Rain; but if it appears after a long time of Wet, it betokens fair *Weather*.

If a *Rainbow* appears in the Morning, it betokens small Rain, and fair *Weather* presently after.

If a *Rainbow* vanishes altogether, fair *Weather* will follow, Winds will arise, and bring great Showers from the Part that the *Rainbow* first begins to break or vanish.

If the *Rainbow* be broken in many Parts, tempestuous Winds are gathering in the Air.

If after a *Rainbow* appears, the Colours grow darker and darker, Rain is gathering; if lighter, and the Colours fairer, fair *Weather*.

Mr. Ozanam says, a *Rainbow* in the East, especially if it be of a bright, lively Colour, is a Sign of great Rain.

A *Rainbow* in the East, in an Evening, prefigures fair *Weather*; but if the Colour is lively and red, it prefigures Wind.

A *Rainbow* in the West foretels an indifferent Quantity of Rain and Thunder.

If two *Rainbows* appear together, it foretels fair *Weather* for the present, but Rain two or three Days after.

Prognostications of the Weather from Mists.

If *Mists* arise out of Ponds and Rivers, to the Top of Hills, it betokens, that there will be Rain soon, either the same Day, or commonly within two or three Days; but if when they arise out of such Places, they vanish away, it is a Sign of fair *Weather*.

If there be a general *Mist*, both on the Hills and Vales, before the Sun-rising near the Full-Moon, it denotes fair *Weather*.

Mr. Ozanam says, If you observe a white Vapour arising upon Waters or Marshes, or Meads, after Sun-set, or before Sun-rising, it will be fair warm *Weather* the next Day.

Signs of Fair Weather.

When the Sun is fair and bright at his rising in a Morning, and is blushing, without Spots or black Clouds near him when he sets at Night, it is a Sign of fair *Weather*.

When the Moon is three or four Days old, and has her Horns sharp, and pointed very bright, it is a Sign of fair *Weather* till she comes to the Full, if not the whole Month.

If the Moon has a bright, shining Circle about her when she is at the Full, it promises fair *Weather* for many Days.

When the Stars shine out clear and bright, and seem to dart out pointed Rays, it is a Sign of fair *Weather*.

Also when little Clouds sink low, as into Valleys at South-East or South-West, it is a Sign of fair *Weather*.

If the Tops of Hills be clear, it is a Sign of fair *Weather*.

If there are to the North West white scattering Clouds, like Fleeces of Wool, it is a Sign of fair *Weather*.

When white Clouds or Mists hang just over Rivers, and disperse no farther, it is a Sign of fair *Weather*.

When a *Rainbow* appears after a Shower, and the blue or yellow Part of it be very bright, and the highest Colour, they are Tokens of fair *Weather*.

When Bees fly far from their Hives, and come home late, it is a Sign of fair *Weather*.

When there are great Swarms of Gnats, it prefigures fair *Weather*.

Glow-worms shining by Night is a Sign of fair *Weather*.

When Kites fly aloft, it bespeaks fair dry *Weather*: The Lord Bacon gives this Reason for it; Because the Kite mounts most into the Air of that Temper wherein he delights; for this aspiring Bird does not so much affect the Grossness of the Air, as the Cold and Freshness of it; for being a Bird of Prey, and therefore hot, he delights in the fresh Air.

When Swallows fly high, it is a Sign of fair *Weather*.

When Owls hoot much, it is a Sign of fair *Weather*: and tho' Owls do always hoot much both in wet and dry *Weather*, yet there is this Difference, that their Hooting is more clamorous in wet *Weather*, but more easy and sedate in fair *Weather*.

When Halcyons, Coots, and other Sea-Fowls, leave the Shores, and flock to the Sea, it is a Sign of fair *Weather*.

When Cattle feed eagerly, without looking about them, it is a Sign of fair *Weather*.

When Fish rise frequently, and flirt upon the Watet, it is a Sign of fair *Weather*.

Spiders Webs in the Air, or on the Grass and Trees, foretel much fair *Weather*.

1. A thick, dark Sky, lasting for some time, without either Sun or Rain, always becomes first fair, then foul, i. e. changes to a fair clear Sky ere it turns to Rain——Thus the Reverend Mr. Clark, who kept a Register of the *Weather* for Thirty Years; since put into Mr. Derbam's Hand by his Grandson, the learned Doctor Samuel Clark. This, he says, he scarce ever knew to fail, at least, when the Wind was in any of the Easterly Points: But Mr. Derbam has observed the Rule to hold good, be the Wind where it will.

The Cause is obvious. The Atmosphere is replete with Vapours, which, tho' sufficient to reflect, and intercept the Sun's Rays from us, yet want Density to descend; and while the Vapours continue in the same State, the *Weather* will do so too. Accordingly, such *Weather* is generally attended with moderate Warmth, and with little or no Wind to disturb the Vapours, and an heavy Atmosphere to sustain them; the Barometer being commonly high.——But when the Cold approaches, and by cendensing, drives the Vapours into Clouds or Drops, then Way is made for the Sun-beams, till the same Vapours, being, by farther Condensation, form'd into Rain, fall down in Drops.

2. *A Change in the Warmth of the Weather, is generally followed by a Change of the Wind* — Thus the Northerly and Southerly Winds, commonly esteemed the Causes of cold and warm *Weather*, are really the Effects of the Cold or Warmth of the Atmosphere; of which Mr. Derham assures us, he has had so many Confirmations, that he makes no Doubt of it.

Thus it is common, to see a warm Southerly Wind suddenly chang'd to the North, by the Fall of Snow or Hail; or to see the Wind in a cold frosty Morning North, when the Sun has well warm'd the Earth and Air, wheel towards the South, and again turn Northerly or Easterly in the cold Evening.

Prognosticks of the Weather by the Winds.

The Winds, says Mr. Pointer, are the Causes of the most sudden and extraordinary Alterations of the Air.

The Nature of the Winds is such, that by the Experience we have of them, we may very nearly predict what *Weather* we shall have for two or three Days after.

As for Example: We know that in our Climate, a South Wind generally brings Rain, and a West Wind more; and the West Wind is the predominant Wind with us, because the Ocean lies on the West Side of our Country.

And also, that a North Wind brings fair *Weather* to us, as well as the East Wind, which does not last so long as the North; therefore the North-east and South-west Winds are those that are necessary chiefly to be treated of.

Some curious Observers of the *Weather* have made this Observation for many Years; That there is as much South and West Wind in eight Years, as there is North and East Winds; and of consequence, as many wet Years as dry ones.

Mr. Pointer gives the following Rules to know when the Wind will set in one of these two Points, for the most part for two or three Months together.

First, as to the North-east Wind: When the Wind turns to the North-east Point, and continues in it two Days without Rain, and does neither turn to the Southward the third Day, nor rain, then it is likely to continue eight or nine Days without Rain, and then to return into the South.

If the Wind turn out of the South to the North-east again, and continues two Days in that Point, and neither rains, nor turns to the South the third Day, it is likely to continue North-east for two Months, and for the most part for three Months. The Wind will finish these Turns towards the North in three Weeks time.

Secondly, as to the South-west Winds; when the Wind has been in the North for two Months or more, and comes to the South, there are usually three or four fair Days at first, and then on the fourth or fifth Day comes Rain, or else the Wind turns North, and continues still dry.

If within a Day or two, without Rain, it returns into the South, and with Rain, turn Northward, and return into the South the first or second Day, as before, two or three times together after this Manner, then it is like to be in the South or South-west two or three Months together for the most part, as it was in the North before.

He does not mention the East or West Winds, because he says, the Rains come usually from the South, or in the shifting of the Wind from the South to the North: As for the Drought, the Wind is, for the most part, North-east.

If it prove fair *Weather* out of the South for a Week together (which is not usual) it is like to be a great Drought, when it has rained for a long Time out of the South before.

The Wind usually turns from the North to the South quietly without Rain; but comes back again into the North, with a strong Wind and Rain.

The greatest Winds which blow down Houses and Trees, usually come by the turning of the Wind out of the South by West into the North, which drives away Rain, and clears the Air.

Of Prognostications of the Weather from the Barometer.

Mr. Derham presents us with the following Remarks:

1. That foggy *Weather* makes the Mercury rise in the Barometer, as well as the North Wind — The Cause he suggests, probably enough, to be the Accession of the Load of Vapour to the former Weight of the Atmosphere: Mizzling *Weather* he likewise observes to have the like Effect.

2. The Colds and Heats in England and Switzerland begin and end nearly about the same time; nay, and any remarkable *Weather*, especially if it continue any while, affects one Place as well as t'other.

3. That the remarkably cold Days in June, Anno 1708, were found in Switzerland to precede ours commonly about five Days or more; and that the remarkable Heats in the following Months began to abate in both Places about the same time, only somewhat sooner here than there.

4. That the Winds in both Places frequently agree, yet they often differ.

5. That the Barometer is always lower at Zurich than at Upminster, by sometimes one, and sometimes two English Inches; but the common Difference is about half an Inch; which may be solved either by supposing Zurich situate one fourth of an Inch higher above the Level of the Sea than Upminster; or else by supposing, that Part of the terraqueous Globe, as lying nearer the Line, to be higher and more distant from the Center than ours is, which lies nearer the Pole.

6. That the Barometer generally rises and falls together at far distant Places: Tho' this Agreement of the Barometer is not so constant between Zurich and Upminster, as in Places nearer

nearer Home, viz. at *London* and *Paris*; where again the Agreement is not so great as between *Upminster* and *Lancashire*.

7. That the Variations of the *Barometer* are greatest, as the Places are nearest the Poles. Thus, e. g. the *Mercury* at *London* has a greater Range by two or three Lines than at *Paris*; and at *Paris*, a greater than at *Zurich*: In some Places near the Equinoctial, there is scarce any Variation at all.

8. That the Rain in *Switzerland* and *Italy* is much greater in Quantity throughout the Year than that in *Essex*; yet the Rains are more frequent, i. e. there are more rainy Days in *Essex* than at either of those Places.

The Proportion of the annual Rains that fall in the several Places we have any good Observations of, stand thus: at *Zurich* the Depth of the annual Rain, at a Medium, is about $32\frac{1}{2}$ Inches; at *Pisa* $43\frac{1}{4}$; at *Paris* 23; at *Lisle* in *Flanders* $23\frac{1}{2}$; at *Townley* in *Lancashire* $42\frac{1}{2}$; at *Upminster* $19\frac{1}{4}$.

9. That Cold contributes greatly to Rain, and that apparently by condensing the suspended Vapours, and making them descend. Thus very cold Months or Seasons are generally followed immediately by very rainy ones; and cold Summers are always wet ones.

10. That high Ridges of Mountains, as the *Alps*, and the Snows they are covered withal, not only affect the neighbouring Places by the Colds, Rains, Vapours, &c. they produce, but even distant Countries, as *England*, often partakes of their Effects—Thus the extraordinary Colds *December* 1708, and the Relaxations thereof were felt in *Italy* and *Switzerland* several Days before they reached us. This Mr. *Derham* thinks is an Indication that they were driven from them to us.

WILDERNESSES, if rightly situated, artfully contrived, and judiciously planted, are the greatest Ornaments to a fine Garden: But it is rare to see these so well executed in Gardens, as to afford the Owner due Pleasure (especially if he is a Person of an elegant Taste) for either they are so situated as to hinder a distant Prospect, or else are not judiciously planted: The latter of which is scarce ever to be found in any of our most magnificent Gardens, very few of their Designers ever studying the natural Growth of Plants, so as to place them in such manner, that they may not obstruct the Sight from the several Parts of the Plantation which are presented to the View: Therefore I shall briefly set down what has occurred to me from time to time, when I have considered these Parts of Gardens, whereby a Person will be capable to form an Idea of the true Beauties, which ought always to be studied in the Contrivance of *Wildernesses*.

1. *Wildernesses* should always be proportioned to the Extent of the Gardens in which they are made, that they may correspond in Magnitude with the other Parts of the Garden; for it is very ridiculous to see a large *Wilderness* planted with tall Trees in a small Spot of Ground; and on the other hand, nothing can

be more absurd than to see little poultry Squares, or Quarters of *Wilderness*-work in a magnificent large Garden.

2. As to the Situation of *Wildernesses*, they should never be placed too near the Habitation, because the great Quantity of Moisture which is perspired from the Trees, will cause a damp unwholesome Air about the House, which is often of ill Consequence. Nor should they be situated so as to obstruct any distant Prospect of the Country, which should always be preserved where-ever it can be obtained, there being nothing so agreeable to the Mind as an unconfined Prospect of the adjacent Country. But where the Sight is confined within the Limits of the Garden from its Situation, then there is nothing so agreeable to terminate the Prospect, as a beautiful Scene of the various Kinds of Trees judiciously planted; and if it is so contrived, that the Termination is planted circularly, with the Concave toward the Sight, it will have a much better Effect than if it end in strait Lines or Angles, which are never so agreeable to the Mind.

3. The Plants should always be adapted to the Size of the Plantation; for 'tis very absurd to see tall Trees planted in small Squares of a little Garden; and so likewise, if in large Designs are planted nothing but small Shrubs, it will have a mean Appearance: It should also be observed, never to plant Ever-greens amongst deciduous Trees, but always place the Ever-greens in a *Wilderness*, or a separate Part of the *Wilderness* by themselves, and that chiefly in Sight, because these afford a continual Pleasure both in Summer and Winter, when in the latter Season, the deciduous Trees do not appear so agreeable.

4. The Walks must also be proportioned to the Size of the Ground, and not make large Walks in a small *Wilderness* (nor too many Walks tho' smaller) whereby the greatest Part of the Ground is employed in Walks: Nor should the grand Walks of a large *Wilderness* be too small; both of which are equally faulty. These Walks should not be entered immediately from those of the Pleasure-Garden, but rather be led into by a small private Walk, which will render it more entertaining: Or if the large Walk be turned in Form of a Serpent, so as not to shew its whole Extent, the Mind will be better pleased than if the Whole were open to the View.

The usual Method of contriving *Wildernesses* is, to divide the whole Compass of Ground, either into Squares, Angles, Circles, or other Figures, making the Walks correspondent to them; planting the Sides of the Walks with Hedges of *Lime*, *Elm*, *Hornbeam*, &c. and the Quarters within are planted with various Kinds of Trees promiscuously without Order. But this can by no means be esteemed a judicious Method, because hereby there will be a great Expence in keeping the Hedges of a large *Wilderness* in good Order, which instead of being beautiful, are rather the reverse; for as these Parts of a Garden should, in a great measure, be designed from Nature, so whatever has the stiff Appearance of Art, does by

no means correspond therewith. Besides these Hedges are generally train'd up so high as to obstruct the Sight from the Trees in the Quarters, which ought never to be done.

In the next place, the Walks are commonly made to intersect each other in Angles, which also shews too formal and trite for such Plantations, and are by no means comparable to such Walks as have the Appearance of *Meanders* or *Labyrinths*, where the Eye can't discover more than twenty or thirty Yards in Length; and the more these Walks are turned, the greater Pleasure they will afford. These should now and then lead into an open circular Piece of Grass; in the Center of which may be placed either an *Obelisk*, *Statue*, or *Fountain*; and if in the Middle Part of the *Wilderness* there be contrived a large Opening, in the Center of which may be erected a Dome or Banqueting House, surrounded with a green Plot of Grass, it will be a considerable Addition to the Beauty of the Place.

From the Sides of the Walks and Openings, the Trees should rise gradually one above another to the Middle of the Quarters, where should always be planted the largest growing Trees, so that the Heads of all the Trees will appear to the View; but their Stems will be hid from Sight, which will have a vastly different Effect from the common Method, where the Trees are planted large and small, without any Order, so that many times the largest are next the Sight, and small ones behind them, just according as it happens; in which manner the small ones, being overhung and shaded, do seldom thrive well.

But in order to plant a *Wilderness* with Judgment, the usual Growth of all the different Sorts of Trees should be well considered, that each may be placed according to the Magnitude to which they generally grow; otherwise, if they are at first planted one above another, as before directed, they will not continue to grow in this Order many Years; for some Sorts will greatly out-grow the others, and thereby render the Plantation less beautiful; but when they are placed according to their usual manner of growing, they will always continue nearly in the same Order, which renders them very entertaining to the Sight.

These Trees should also be allow'd a proportionable Distance, according to their Growth, and not crowded so close as is commonly practis'd, whereby there are four times the Number of Trees planted which need be; and this close planting causes them to aspire to a great Height, but then they want the noble Diffusion of Branches, which is vastly more agreeable to the Sight than a Parcel of thin, taper Stems, with scarcely any Heads, as is too often the Case in some of the largest Gardens in *England*, where, instead of looking at a noble Parabola of Trees, with their spreading globular Heads, a Parcel of naked Stems present themselves to View; and where the Trees are thus crowded they never thrive half so well, nor will they continue half so long, as those which are allow'd a proper

Distance; for their Roots running and interfering with each other, do draw the Nourishment away faster than the Ground can supply them; which causes their Leaves to be small, and, in dry Seasons, to decay and fall off long before their usual Time, and thereby renders the Plantation less agreeable.

In the Distribution of these Plantations, in those Parts which are planted with deciduous Trees, may be planted next the Walks of Openings, *Roses*, *Honeysuckles*, *Spirea frutex*, and other Kinds of low flowering Shrubs, which may be always kept very dwarf, and may be planted pretty close together; and at the Foot of them, near the Sides of the Walks, may be planted *Primroses*, *Violets*, *Daffodils*, and many other Sorts of Wood Flowers, not in a strait Line, but rather to appear accidental, as in a natural Wood. Behind the first Row, of Shrubs should be planted *Syringa's*, *Cytissus's*, *Althaea frutex*, *Mezerion's*, and other flowering Shrubs of a middle Growth, which may be back'd with *Laburnums*, *Lilacs*, *Gelder Roses*, and other flowering Shrubs of large Growth; these may be back'd with many other Sorts of Trees, rising gradually to the Middle of the Quarters, from whence they should always slope down every Way to the Walks.

By this Distribution you will have the Pleasure of the flowering Shrubs near the Sight, whereby you will be regal'd with their Scent, as you pass thro' the Walks; which is seldom observed by those who plant *Wildernesses*: for nothing is more common than to see *Roses*, *Honey-Suckles*, and other small flowering Shrubs, placed in the Middle of large Quarters, under the Dropping and Shade of large Trees, where they seldom thrive; and if they do, the Pleasure of them is lost, because they are secluded from the Sight. If these Quarters are slightly dug every *Winter*, it will keep the Ground clean from noxious Weeds, and be a great Benefit to the Trees. And the Expence of doing this, where Labour is cheap, cannot be very considerable unless in very great Plantations.

But beside these Grand Walks and Openings, (which should always be laid with Turf, and kept well mowed) there should be some smaller Serpentine Walks through the Middle of the Quarters, where Persons may retire for Privacy. There need be nothing but the Ground of the Place made level and kept hoed to clear it from Weeds, which will be no great Trouble to do with a *Dutch Hoe*, which is broad, and will make great Riddance; and then rake them over to make them handsome. These Walks need not be very broad, but should be turned in such a manner as not to deviate far from the Middle of the Quarter, because there the Trees being largest, will afford the amplest Shade; five or six Feet will be a sufficient Width for these Walks, in large Quarters; but in small ones, four Feet is full enough. By the Sides of these Private Walks may also be scattered some Wood-Flowers and Plants, which, if artfully planted, will have a very good Effect.

In the general Design for these *Wildernesses*, it should not be studied to make the several Parts correspondent, for that is so formal and stiff, as to be now quite rejected; the greater Diversity there is in the Distribution of these Parts, the more Pleasure they will afford; and since, according to this Method of Designing and Planting, the different Parts never do present themselves to the same View, so it is no matter how different they are varied asunder; that Part of them which is most in View from the House or other Parts of the Garden, may be planted with Evergreens; but the other Parts may be planted with deciduous Trees in the foregoing manner.

The Part planted with Evergreens may be dispos'd in the following manner, *viz.* in the first Line next the great Walks, may be placed *Laurus Tinus*, *Boxes*, *Spurge Laurel*, *Juniper*, *Savin*, and other dwarf Evergreens; behind these may be placed *Laurels*, *Hollies*, *Arbutus's*, and other Evergreens of a larger Growth; next to these may be placed *Alaternus's*, *Phillyrea's*, *Yews*, *Cypress's*, *Virginian Cedars*, and other Trees of the same Growth; behind these may be planted *Norway* and *Silver Firs*, the *True Pine*, and other Sorts of the like Growth; and in the Middle should be planted *Scotch Pines*, *Pinastrer*, and other of the largest growing Evergreens, which will afford a most delightful Prospect, if the different Shades of their Greens are curiously intermix'd. And in order to render the Variety greater, there may be many Kinds of hardy Evergreens obtain'd from the North Parts of *America*, as there are already some in *England*, which are very fit for this Purpose, and are mention'd in different Parts of this Book.

This manner of separating the Evergreens from the deciduous Trees, will not only make a much better Appearance, but also cause them to thrive far beyond what they usually do when intermix'd; therefore I should never advise any Person to plant them promiscuously together.

By what I have said concerning the Planting the Trees in Rows, one behind another, according to their different Growths, I would not have it understood, that I mean the placing them in strait Lines, which is too stiff and formal for these Plantations; all that is intended, is to place the Front Rows of Trees on each Side the Walks, at an equal Distance from the Side of the Walks; but the Lines of Trees (especially the three first) must turn in the same manner as the Walks; those behind may be placed after any manner, provided Care be taken to allow each sufficient Room to grow, and that there may appear no uneven Gaps in the Distance of their Heads, but that they may all rise gradually, so as to form a handsome Slope.

In small Gardens, where there is not Room for these magnificent *Wildernesses*, there may be some rising Clumps of Evergreens, so design'd as to make the Ground appear much larger than it is in reality; and if in these there are some Serpentine Walks well con-

trived, it will greatly improve the Places, and deceive those who are unacquainted with the Ground, as to its Size. These Clumps or little Quarters of Evergreens should be placed just beyond the plain Opening of Grass before the House, where the Eye will be carried from the plain Surface of Grass, to the regular Slope of Evergreens, to the great Pleasure of the Beholder; but if there is a distant Prospect of the adjacent Country from the House, then this should not be obstructed, but rather a larger Opening allow'd for the View, bounded on each Side with these rising Clumps, which may be extended to half the Compass of the Ground: And on the back Part from the Sight, may be planted the several Kinds of flowering Shrubs, according to their different Growths, which will still add to the Variety. These small Quarters should not be furrounded with Hedges for the Reasons before given for the larger Plantations; nor should they be cut into Angles, or any other studied Figures, but be design'd rather in a rural Manner, which is always preferable to the other for these Kinds of Plantations.

In *Wildernesses* there is but little Trouble or Expence after their first planting, which is an Addition to their Value; the only Labour required, is to mow and roll the large Grass Walks, and to keep the other Ground Walks free from Weeds. And in the Quarters if the Weeds are hoed down two or three times in a *Summer*, it will still add to their Neatness. The Trees should also be pruned to cut out all dead Wood or irregular Branches, where they cross each other, and just to preserve them within due Bounds; and, as was before observed, if the Ground be slightly dug between the Trees, it will greatly promote their Vigour. This being the whole Labour of a *Wilderness*, 'tis no Wonder they are so generally esteem'd, especially when we consider the Pleasure they afford.

SWEET-WILLIAMS; *vide* *Caryophyllus Barbatus*.

WILLOW; *vide* *Salix*.

WILLOW the French; *vide* *Chamænerion*.

WIND, is defin'd to be the Stream or Current of the Air, together with such Vapours as the Air carries along with it: Or it is a sensible Agitation of the Air, whereby a large Quantity thereof flows out of one Place or Region unto another.

The Antients made but four *Winds*, according to the four Cardinal Points; but this was quickly look'd upon as too gross a Division; the following Age added eight more to this Number, which was thought too nice, and a subdividing; and therefore they reduc'd the last Number to four, taking every other or middle *Wind*, and adding them to the old Account. But our Sailors, who are far beyond the Antients for their Skill in Navigation, have divided the Horizon into Thirty-two equal Parts, adding Twenty-eight to the four Cardinal *Winds*; a thing exceeding useful

ful in Navigation, but of no great Concern in Natural Philosophy, unless it be to give a Hint that the *Wind* blows from all Parts of the Heavens.

As to the Physical Cause of Winds.

Some Philosophers, as *Des Cartes*, *Robault*, &c. account for the general *Wind* from the diurnal Rotation of the Earth; and from this general *Wind* derive all the particular ones.

They say, the Atmosphere investing the Earth, and moving round it, that Part will perform its Circuit soonest, which has the smallest Circle to describe. The Air therefore near the Equator, will require a somewhat longer Time to perform its Course in from *West* to *East* than that nearer the Poles, that as the Earth turns Eastward, the Particles of the Air near the Equinoctial, being exceeding light, are left behind, so that in respect of the Earth's Surface they move Westwards, and become a constant *Easterly Wind*.

This Opinion seems confirm'd, for that these *Winds* are found only near the Equinoctial, in those Parallels of Latitude, where the diurnal Motion is swiftest; but the constant Calms in the *Atlantick Sea* near the Equator, the Westerly *Winds* near the Coast of *Guiney*, and the periodical Westerly *Monsoons*, under the Equator of the *Indian Sea*, seemingly declare the Insufficiency of that Hypothesis.

Besides, the Air being kept to the Earth by the Principle of Gravity, would in Time acquire the same Degree of Velocity that the Earth's Surface moves with, as well in respect of the diurnal Rotation, as of the Annual about the Sun, which is about thirty Minutes swifter.

It remains therefore to substitute some other Cause capable of producing a like constant Effect, not liable to the same Objections, but agreeable to the known Properties of the Elements of Air and Water, and the Laws of the Motion of fluid Bodies: Such an one is the Action of the Sun's Beams upon the Air and Water as he passes every Day over the Oceans, considered together with the Nature of the Soil, and Situation of the adjoining Continents. This has been done by Doctor *Halley*.

Therefore, according to the Laws of *Statics*, the Air which is less rarefied or expanded by Heat, and consequently more ponderous, must have a Motion towards those Parts thereof which are more rarefied and less ponderous, to bring it to an *Equilibrium*; also the Presence of the Sun continually shifting to the Westward, that Part to which the Air tends, by reason of the Rarefaction made by his greatest Meridian Heat, is with him carried Westward; and consequently the Tendency of the whole Body of the lower Air is that Way.

Thus a general Easterly *Wind* is formed, which being impress'd upon all the Air of a vast Ocean, the Parts impel one the other, and so keep moving till the next Return of the Sun; whereby so much of the Motion as was

lost, is again restored; and thus the Easterly *Wind* is made perpetual.

From the same Principle it follows, that the *Easterly Wind* should on the North Side of the Equator be to the Northwards of the East; and in South Latitudes, to the Southward thereof; for near the Line the Air is much more rarefied, than at a greater Distance from it; because the Sun is twice in a Year vertical there, and at no Time distant above 23 Degrees $\frac{1}{2}$; at which Distance the Heat being at the Sine of the Angle of Incidence, is but little short of that of the perpendicular Ray. Whereas, under the Tropicks, tho' the Sun stay long vertical, yet he is a long 47 Degrees off; which is a kind of *Winter*, wherein the Air so cools, as that the *Summer* Heat cannot warm it to the same Degree with that under the Equator. Wherefore the Air towards the Northward and Southward being less rarefied than that in the Middle, it follows, that from both Sides it ought to tend towards the Equator. This Motion, compounded with the former Easterly *Wind*, answers all the *Phænomena* of the general Trade *Winds*; which, if the whole Surface of the Globe were Sea, would undoubtedly blow all round the World, as they are found to do in the *Atlantick* and *Æthiopic* Ocean.

But seeing so great Continents do interpose and break the Continuity of the Oceans, Regard must be had to the Nature of the Soil, and the Position of the high Mountains, which are the two principal Causes of the several Variations of the *Wind* from the former general Rule; for if a Country lying near the Sun, prove to be flat, sandy and low Land, such as the Desarts of *Libya* are usually reported to be, the Heat occasioned by the Reflection of the Sun's Beams, and the Retention thereof in the Sand, is incredible to those who have not felt it; whereby the Air being exceedingly rarefied, it is necessary that this cooler and more dense Air should run thitherwards to restore the *Equilibrium*.

This is suppos'd to be the Cause why, near the Coast of *Guiney*, the *Wind* always sets in upon the Land, blowing Westerly instead of Easterly; there being sufficient Reason to believe that the Inland Parts of *Africa* are prodigiously hot, since the Northern Borders thereof were so intemperate, as to give the Antients Cause to conclude, that all beyond the Tropicks was uninhabitable by Excess of Heat.

From the same Cause it happens, that there are so constant Calms in that Part of the Ocean called the *Rains*; for this Tract being placed in the Middle, between the Westerly *Winds* blowing on the Coast of *Guiney*, and the Easterly Trade *Winds* blowing to the Westward thereof, the Tendency of the Air here is indifferent to either; and so stands in *Equilibrium* between both; and the Weight of the incumbent Atmosphere being diminished by the continual contrary *Winds* blowing from hence, is the Reason that the Air here holds not the copious Vapour it receives, but lets it fall in so frequent Rains.

But as the cool and dense Air, by reason of the greater Gravity, presses upon the hot and rarefied, 'tis demonstrative that this latter must ascend in a continued Stream, as fast as it rarefies; and that being ascended, it must disperse itself to preserve the *Equilibrium*; that is, by a contrary Current the upper Air must move from those Parts where the greatest Heat is; so, by a kind of Circulation, the *North-East Trade Wind* below will be attended with a *South-westerly* above: That this is more than a bare Conjecture, the almost instantaneous Change of the *Wind* to the opposite Point, which is frequently found in passing the Limits of the *Trade Winds*, seems to assure us; but that which above all confirms this Hypothesis, is the *Phænomenon* of the *Monsoons*, by this means most easily solved, and without it hardly explicable.

Supposing therefore such a Circulation as above, 'tis to be considered, that to the Northward of the *Indian Ocean*, there is every where Land within the usual Limits of the Latitude of Thirty; viz. *Arabia, Persia, India, &c.* which for the same Reason as the *Mediterranean* Parts of *Africa*, are subject to unsufferable Heats when the Sun is to the North, passing nearly vertical; but yet are temperate enough, when the Sun is remov'd towards the other *Tropick*, because of a Ridge of Mountains at some Distance within the Land, said to be frequently in *Winter* covered with Snow, over which the Air, as it passes, must needs be much chilled.

Hence it comes to pass, that the Air coming, according to the general Rule, out of the *North East* in the *Indian Sea*, is sometimes hotter, sometimes colder than that which by this Circulation is return'd out of the *South-West*, and, by consequence, sometimes the under Current or *Wind*, is from the *North-East*, sometimes from the *South-West*.

That this has no other Cause, is clear from the Times wherein those *Winds* set, viz. in *April*, when the Sun begins to warm those Countries to the North, the *South-West Monsoons* begin, and blow during the Heat till *October*, when the Sun being retired, and all things growing cooler Northward, and the Heat increasing to the South, the *North-East*, enter and blow all the *Winter*, till *April* again. And it is undoubtedly from the same Principle, that Southward of the Equator, in Part of the *Indian Ocean*, the *North-east Winds* succeed the *South-East*, when the Sun draws near the *Tropick of Capricorn*.

But in this latter, occurs a Difficulty not well to be accounted for, which is, why this Change of the *Monsoons* should be any more in this Ocean, than in the same Latitudes in the *Ethiopic*, where there is nothing more certain than a *South-East Wind* all the Year.

It is likewise very hard to conceive, why the Limits of the *Trade Winds* should be fixed about the thirtieth Degree of Latitude all round the Globe; and that they should so seldom transgress or fall short of those Bounds; as also that in the *Indian Sea*, only the Northern Part should be subject to the change-

able *Monsoons*; and in the *Southern*, there should be a constant *South-East*.

This Account of *Wind* is taken from the Learned Dr. *Halley's* Discourse on this Subject. *Philosoph. Transactions*, N^o 183.

The Reverend Mr. *Robinson* gives this Account of the Origin of *Wind*; That in the greatest Probability it proceeds from vast Swarms of nitrous Particles, which rise from the Bottom of the Sea; which having been put into Motion, either by the central Fire, or by that Heat and Fermentation, which do abound in this huge Body of the Earth; and therefore this first Commotion, which is excited by the said Fermentation is called a *Bottom Wind*, which is presently discovered by *Porpoises* and other Sea Fish, that delight to sport and play upon the Waves of the Sea, and do by their playing give to the Mariners the first Notice of an approaching Storm.

When these nitrous Swarms are risen towards the Surface of the Sea, they cause, in a dark Night, such a shining Light upon the Waves, as if the Sea were on Fire, and being delivered from the brackish Water, and received into the open Air, those fiery and shining Meteors which fix upon the Masts and Sides of the Ships, are only nitrous Particles condensed by the circumambient Cold, and like that which the Chymists call *Phosphorus*, or artificial Glow-worm, shine and cast a Light, but have no Heat.

This gives the second Notice to Mariners that the Storm is rising, for the Sea begins to be rough upon the first breaking out of the *Wind*, and the Waves swell and rise, tho' the Air at the same Time is calm and clear.

This boiling Fermentation of the Sea causes the Vapours to arise, which, by the Intensity of the circumambient Cold, are condensed into thick Clouds and fall down in Storms of *Wind* and Rain; first upon the Sea from whence they rose, and then the attractive Power of the Mountain Cold, by a secret Magnetism between Vapour and Cold, attracts the waterish Vapours, and intermix, with nitrous Particles, ascend to the high Tops of Mountains and Hills, where they hang hovering in thick Fogs and watery Mists, until the atmospherical Heat rarefies the nitrous Part of the Fog, which is always uppermost, and appears white and translucent, into brisk Gales of *Wind*.

And the Intensity of the atmospherical Cold, having attracted the Vapours into the colder Regions of the Air, where they are condensed into Clouds, the *Wind* breaks, dissipates and drives them before it, till they fall down in Rain, and water the Surface of the Earth.

And this seems to be the Reason why they have but little *Wind*, and less Rain in *Egypt*, and those level Countries where they have no Mountains.

Mr. *Derham* says, *Wind* is a Current of the Air, and that which excites or alters its Currents may justly be said to be the Cause of *Wind*.

An *Æquipoise* of the Atmosphere produces a Calm; but if that *Æquipoise* be taken off, more or less, a Stream of Air or *Wind* is accordingly thereby produced, either stronger or weaker, swifter or slower.

And there are divers Things that may cause such Alterations in the *Æquipoise* or Balance of the Atmosphere, viz. Eruptions of Vapours from the Sea and Land, Rarefactions and Condensations in one Place more than in another, the Falling of Rain, Pressure of the Clouds, &c.

It is observed of Caves, that they do always emit *Winds*, more or less; and as great Caves, so great Lakes also send forth *Winds*; but the most universal and constant Alterations of the Atmosphere are produced by Heat and Cold.

This is manifest in the general *Trade-winds*, which between the Tropicks blow all the Year from East to West: If the Cause of this be (according to the Opinion of some ingenious Men) the daily Progress of the Sun round that Part of the Globe, and by his Heat rarefying one Part of the Air, while the cooler and heavier Air behind presses after.

And so the Land and Sea Breezes, and so in our Climate the Northerly and Southerly *Winds* (which are commonly esteem'd the Cause of warm and cold Weather) are really the Effects of the Cold or Warmth of the Atmosphere.

Of this, Mr. *Derham* says, he has had so many Confirmations, that he does not doubt of it; and he produces for an Instance of it, that it is not uncommon to see a warm Southerly *Wind*, on a sudden, changed to the North by the Fall of Snow or Hail; and in a cold frosty Morning, to see the *Wind* North, and to wheel about toward the Southerly Quarters, when the Sun has well warm'd the Air; and then again, in the cold Evening to turn Northerly or Easterly.

And hence also it is, that the *Winds* and Clouds are oftentimes contrary to one another in Thunder Showers (especially if Hail falls), the sultry Weather below directing the *Wind* one way, and the Cold above the Clouds another way.

And that he has observ'd several Times, that when the Morning has been warm, and what *Wind* was stirring was West-south-west, that the Clouds were thick and black (as they generally are when Snow follows); and that a little before Noon, the *Wind* veer'd about to the North by West, and sometimes to other Points; the Clouds at the same Time flying some North by West and some South-west; that about one o'Clock it rained apace, the Clouds sometimes flying North-east, then North, and at last both *Wind* and Clouds have settled North by West, and that at that Time the Sleet fell very plentifully, and it grew very cold.

From all which he observes;

First, That though the Region below was warm, the Region of the Clouds was cold, as the black Snowy Clouds shew'd.

Secondly, That the Struggle between the Warmth of our Region and the Cold of the cloudy Region, stopp'd the airy Currents of both Regions.

Thirdly, That the Falling of the Snow through our warmer Air, did at first melt into Rain, but after the superior Cold had conquer'd the inferior Warmth, it became Sleet.

Fourthly, That as the Cold prevail'd by Degrees, it wheel'd about both the *Winds* and Clouds, from the Northward towards the South.

To this a certain Author replies;

Several learned and ingenious Men have advanced several Speculations, in order to account for the Productions of the *Wind*, or Current of the Air, and have, in some measure, accounted for some particular Breezes or constant *Winds*; yet we are still at a Loss to determine from whence the Agitations of the Air in general do arise, or to assign the Causes of the violent Motions and alterable Courses of it.

Some Suppose the Heat of the Sun to be an Agent therein, by rarefying certain Parts of the Atmosphere.

To this another ingenious Author supposes as follows: That the Heat of the Sun rarefying the Atmosphere, cannot be imagined to produce a Storm, or occasion the sudden Generation of a great *Wind*: Nor upon this Supposition can the same *Winds* be expected in the Night, when the Sun is absent, as in the Day-time, when he is present; or that there should be any *Winds* in those larger Latitudes of the Earth, where, in the *Winter*, there is scarce a sensible Difference of the Sun's Heat in the Day more than in the Night, whereas there are more *Winds* found to be in those Parts than in hotter Climates, and are greatest in the *Winter*.

Besides, there are many more Objections that over-turn this Probability of the Rise of *Wind*.

He adds, That in order to trace out the Causes of the *Wind* by Effects and *Phænomena*, we may observe, that *Wind* is generally attended with a cloudy Sky, and that there are more *Winds* in the *Winter*, when there is more Rain and obscure Weather, than in the *Summer*; and likewise in our Northerly Climates than in lesser Latitudes, that more usually are attended with a fair and serene Atmosphere, which makes it probable, that the aqueous Vapours that are sustained in the Air, from whence proceed Clouds and Rains, may be the Foundation of *Winds*.

It is past all Dispute, that there is always a vast Quantity of Vapours contain'd in the Atmosphere, as is manifest from the great Quantity of Water that is constantly discharg'd from thence in Rain, Snow, &c. And Dr. *Halley* has given us a curious Estimate of the vast Quantity of Water wasted in Vapours by the Surface of the Seas and Rivers in the World, and diffus'd in the Atmosphere.

It is very well known, that Water has a very great Expansion in Vapours; so that every cubick Inch of Water reduc'd to Vapours, does exclude as much Air as the Quantity of Steam or Vapours it will produce; and, *à contra*, if these Vapours be exempt of included Air, the Condensation of what appertains to every cubick Inch of Water, leaves as great a *Vacuum* as the Difference is between the Spaces taken up by evaporated and natural Water.

But it is evident that Vapours are empty, and their Expansion is not made by Air inclos'd in the small Particles which constitute them, as is seen by those Engines that are contriv'd, by Raising of Water by means of Steam.

For the Condensation of the Steam or Vapours causes a *Vacuum*, which gives Room to the Pressure of the Atmosphere, to act as a Power for working the Machine; a Specimen of which we have in the Engine at *York-Buildings in London*.

Nor is it possible upon the Principles of Nature, that have hitherto been discover'd, that Vapours could ascend in the *Medium* of the Air, if their expanded Particles were filled by the same Fluid: For, if so, the Weight of the Water, together with that of the included Air, would render each Particle or *Vesicula* specifically heavier than Air of it self, and then of consequence it must sink, unless it were obstructed by some Cause different from that of Gravity.

Therefore it is necessary that Vapours be exhausted, in order to their acquiring a Bulk that shall render them lighter than Air, in order to swim therein.

The said ingenious Author, in order to prove that Vapours are not fill'd by Air, and the great Extent that Water occupies in Vapours, made use of the following Experiment.

He caus'd a Bellows to be made of two circular Boards, of about ten Inches Diameter, which being filled, represented a Cylinder 10 $\frac{1}{2}$ Inches in Height; over a Hole in the Centre of one of the Boards, he fix'd a Pipe of one Inch and an half Diameter; the End of this Pipe shut into a Socket belonging to a Vessel, by which means there was a Communication between the Inside of the Bellows and of this Vessel, and there was a little Pin, which being turn'd round, stopp'd the Pipe, by a small Board that moved over it in the Inside of the Bellows: There was also a Wire in the same manner, to stop the Socket of the Vessel.

Into this Vessel he poured a certain Quantity of boiling Water, which together with the Vessel weigh'd 25 Ounces $\frac{1}{4}$ *Troy-weight*, and then having compress'd the Bellows, and brought the two Boards close, he fix'd the Vessel to it, binding some Leather fast over the Part where they joined, to prevent a Communication with the exterior Air. This Vessel being set over the Fire, the Water contain'd in it was made to boil violently, the Steam of which immediately swell'd the Bellows, and quite filled it in a small Time.

That then he stopp'd the Vessel by turning the Wire, and separating it from the Bellows, found it weigh'd 24 Ounces $\frac{1}{2}$; that is, it had lost $\frac{1}{2}$ of an Ounce of its former Weight.

The Content of the Bellows was 824,25 cubical Inches; but allowing for the Separation of the Boards, when compress'd, which were an Inch distant, the Quantity of Vapours therein, was but 745,75 cubical Inches; so that from $\frac{1}{2}$ of an Ounce, or 1,42 cubical Inch of Water, filled 745,75 cubical Inches, without the Help of any Air.

Besides, he repeated this Experiment, and when the Bellows were fill'd, he remov'd them from the Fire to a cool Place, where the Vapours condensing, the Bellows was depress'd by the Weight of the Atmosphere, 'till quite exhausted, which could not have been, unless the Vapours were devoid of Air; for otherwise that which they must have emptied would have supported the Bellows.

We may therefore, he says, venture to conclude, that Vapours are made up of small excavated Globules of Water, which owe their Inflation only to Heat; and this seems to be confirm'd by their Absolution of Cold.

This is after the Rate of one Inch of Water to fill 2100,6 Inches of Steam or Vapours, according to the specifick Weight of Water.

Some have asserted, that an Inch of Water makes 13000 Inches of Steam; so then, according to the Experiment before-mention'd, all the Water that falls in Rain, Snow, &c. possess'd 2100,6, or to say no more than 2000 times the Space, when it floated in the Atmosphere in Vapours, and the Condensation thereof must occasion *Vacuums*, which, if collected, would be a Space 2000 times greater than what is taken up by it in Water, which will put the surrounding Air in no small Motion to restore so considerable a Deficiency.

It is not at all improbable, that there is often assembled in the Atmosphere, a sufficient Quantity of Vapours to maintain a lasting Condensation, and that it is also quick enough at sometimes to create a great *Wind*.

He adds, that according to Dr. *Halley's* Experiment, it may be computed, that there is 129796,219 cubical Miles of the Atmosphere fill'd by Vapours every Day. This prodigious Quantity being divided and arranged in Bodies at various Situations throughout the World, occasions, by the mutual Condensations, almost constant Results of the Air, to supply the empty Places, and he supposes, may be thought abundantly sufficient for producing and maintaining all *Winds* universally.

From these and other Considerations he concludes, that the Production of *Winds* depend chiefly on the Condensation of Vapours; and in order to confirm his Hypothesis, proceeds to explain several Properties and Cases solvable thereby.

1. That the Direction or Course of any *Wind*, is according to the Situation of the Body of Vapours, whose Condensation produces it; so if a Concourse of Vapours be gather'd over the Kingdom of *France*, the

Condensation thereof would draw the Air from *England* in a Southerly Direction, in *Spain* would be a Northerly Wind, in *Germany* would blow Westerly, at the Bay of *Biscay* an Easterly Wind.

2. That the Force or Intensity of a Wind is as the Extension of the condensing Vapours, and the Quickness of their Condensation.

3. He accounts for there being more Winds about the Equinoxes than at other Seasons.

4. He adds, that it is understood that the greater Quantities of Rain that fall in the *Winter*, must occasion more Winds than in *Summer*, there being a proportionable Quantity of Vapours condens'd; and likewise,

5. That there are more Winds in distant Latitudes than towards the Equator, because the former are more subject to Rain.

6. Why there is more Rain and Wind in the *Winter* than in the *Summer*, when the Heat of the Sun in the former is more weak and languid, by which it is incapable of raising any great Quantity of Vapours to produce that Rain and Wind.

7. Why they have more Rain and Wind towards the Poles than about the Equator, altho' the latter is a Part of the World where the Sun makes the greatest Evaporation.

The Industry of some late Writers having brought the Theory and Production, and Motion of the Winds, to somewhat of a Mathematical Demonstration, we shall here give it the Reader in that Form.

Laws of the Production, &c. of Winds.

If the Spring of the Air be weakened in any Place, more than in the adjoining Places, a Wind will blow through the Place where the Diminution is.

For, since the Air endeavours by its elastick Force to expand itself every Way, if that Force be less in one Place than another, the *Nisus* of the more against the less elastick, will be greater than the *Nisus* of the latter against the former — The less elastick Air, therefore, will resist with less Force than it is urged by the more elastick; consequently the less elastick will be driven out of its Place, and the more elastick will succeed.

If now the Excess of the Spring of the more elastick, to that of the less elastick, be such as to occasion a little Alteration in the Baroscope, the Motion both of the Air expell'd, and that which succeeds it, will become sensible. Q. E. D.

2. Hence, since the Spring of the Air increases, as the compressing Weight increases, and compress'd Air is denser than Air less compress'd; all Winds blow into a rarer Air out of a Place fill'd with a denser.

3. Wherefore, since a denser Air is specifically heavier than a rarer, an extraordinary Lightness of the Air in any Place must be attended with extraordinary Winds or Storms.

Now an extraordinary Fall of the Mercury in the Barometer, shews an extraordinary

Lightness of the Atmosphere; therefore it is no Wonder if that foretels Storms.

4. If the Air be suddenly condens'd in any Place, its Spring will be suddenly diminish'd: Hence, if this Diminution be great enough to affect the Barometer, there will a Wind blow through the condens'd Air.

5. But since it cannot be suddenly condensed, unless it has before been much rarefied; there will a Wind blow through the Air as it cools, after having been violently heated.

6. In like manner, if Air be suddenly rarefied, its Spring is suddenly increas'd; wherefore it will flow through the contiguous Air, not acted on by the rarefying Force — A Wind therefore will blow out of a Place in which the Air is suddenly rarefied; and on this Principle it is, in all Probability, that,

7. Most Caves are found to emit Wind, either more or less — Since the Sun's Power in rarefying the Air is notorious, it must necessarily have a great Influence on the Generation of Winds.

The Rising and Changing of the Wind is determin'd experimentally, by means of Weather-cocks placed on the Tops of Houses, &c. — But these only indicate what passes about their own Height, or near the Surface of the Earth: *Wolfius* assuring us, from Observations of several Years, that the higher Winds which drive the Clouds, are different from the lower ones, which move the Weather-cocks.

Mr. *Derham* observes, upon comparing several Series of Observations made of the Winds in divers Countries, viz. *England*, *Ireland*, *Switzerland*, *Italy*, *France*, *New-England*, &c. That the Winds in those several Places seldom agree; but when they do, it is commonly when they are strong, and of long Continuance in the same Quarter; and more, he thinks, in the Northerly and Easterly than in other Points — Also, that a strong Wind in one Place is oftentimes a weak one in another; or moderate, according as the Places are nearer or more remote.

The Laws of the Force and Velocity of Wind.

Wind being only Air in Motion, and Air a Fluid, subject to the Laws of other Fluids, its Force may be brought to a precise Computation: Thus —

The Ratio of the Specific Gravity of any other Fluid to that of Air, together with the Space that Fluid, impell'd by the Pressure of the Air, moves in any given Time, being given; we can determine the Space which the Air itself, acted on by the same Force, will move in the same Time, by this Rule.

1. As the Specific Gravity of Air is to that of any other Fluid, so reciprocally is the Square of the Space which that Fluid, impell'd by any Force, moves in any given Time, to the Square of the Space which the Air, by the same Impulse, will move in the same Time.

Supposing therefore, the Ratio of the Specific Gravity of that other Fluid to that of Air,

Air, to be $= b : c$; the Space describ'd by the Fluid to be call'd f ; and that which the Air will describe by the same Impulse x : The Rule gives us $x = \sqrt{b s : c}$.

Hence, if we suppose Water impell'd by the given Force, to move two Feet in a Second of Time; then will $f = 2$; and since the specifick Gravity of Water to Air, is as 970 to 1, we shall have $b = 970$, and $c = 1$; consequently $x = \sqrt{970 \cdot 4} = \sqrt{3880} = 62.3$ Feet; the Velocity of the Wind, therefore, to that of Water, moved by the same Power, will be as 62.3 to 2; i. e. if Water move 2 Feet in a Second, the Wind will fly 62.3 Feet.

2. Add, that $f = \sqrt{c x^2 : b}$ and therefore the Space any Fluid, impell'd by any Impression, moves in any Time, is determin'd by finding a fourth Proportional to the two Numbers that express the Ratio of the specifick Gravity, and the Square of the Space the Wind moves in the given Time. — The Square Root of that fourth Proportional is the Space requir'd.

M. Mariotte, *e. gr.* found, by various Experiments, that a pretty strong Wind moves 24 Feet in a Second of Time; wherefore, if the Space which the Water, acted on by the same Force as the Air, will describe in the same Time, be requir'd: Then will $c = 1$. $x = 24$, $b = 970$, and we shall find $f = \sqrt{576 : 970} = \frac{24}{\sqrt{970}}$.

3. The Velocity of Wind being given, to determine the Pressure required to produce that Velocity; we have this Rule.

The Space the Wind moves in one Second of Time, is to the Height a Fluid is to be raised in an empty Tube, in order to have a Pressure capable of producing that Velocity; in a Ratio compounded of the specifick Gravity of the Fluid to that of Air, and of quadruple the Altitude a Body descends in the first Second of Time, to the aforesaid Space of Air.

Suppose, *e. gr.* the Space the Air moves in a Second $a = 24$ Feet, or 288 Inches; call the Altitude of the third x , and the Ratio of Mercury to the Air $b : c = 13580 : 1$, $d = 181$ Inches; x will be less than the Number by one Line, or $\frac{1}{12}$ of an Inch. And hence we see why a small, but sudden Change in the Barometer, should be follow'd with violent Winds.

The Force of the Wind is determin'd experimentally, by a peculiar Machine call'd an *Anemometer*, or *Wind-Measurer*, which being moved by means of Sails, like those of a *Wind-mill*, raises a Weight, that still the higher it is raised, receding further from the Center of Motion, by sliding along an hollow Arm fitted on to the Axis of the Sails, becomes heavier and heavier, and presses on the Arm, 'till being a Counterpoise to the Force of the Wind on the Sails, it stops the Motion of them. An Index then fitted upon the same Axis, at right Angles with the Arm, by its Rising or Falling Points out the Strength of the Wind, on a Plane divided like a Dial-Plate, into Degrees.

Winds are either *constant* or *variable*. The constant *Winds* are up and down always at a certain Time of the Year, and in certain Parts of the World; but the variable vary so much, that they cannot be reduced to any Rule.

The constant and periodical *Winds* are only in the widest Seas; as in the *Atlantick* and *Ethiopic* Seas, between the Tropicks, there is generally an Easterly Wind all the Year long, without any considerable Variation, unless declining some few Points towards the North or South; but all along the Coasts of *Guiney*, for five hundred Leagues, the Southerly and South-west *Winds* are perpetual.

In the *Indian Ocean* the *Winds* are partly general, as in the *Ethiopic Ocean*, and partly periodical; that is, they blow one Way half the Year, and upon the opposite Points the other half.

This that is here said relates to the Sea *Winds*, at some Distance from the Land; for upon the Land, and near the Shores, the Land and Sea-Breezes are almost every where sensible; and the great Variety that happens in their Periods, Force, and Direction, happens from the Situation of Mountains, Vallies, and Woods, and from the various Texture of the Soil, more or less capable of retaining or reflecting Heat, or of exhaling or condensing Vapours.

Of variable *Winds*, some are common to all Countries, others are more peculiar to some particular Parts.

Of the latter Sort, the most famous are *Hurricanes*, which chiefly infest the *Caribbee* Islands; but are not anniversary, nor equally frequent.

The Fury is so great, that they throw down all before them, tear up Trees, overturn Houses, toss Ships prodigiously, and blow about Things of vast Weight. They are not even, continued *Winds*, but blow in Gusts, which suddenly come and go; neither do they extend very wide, but are sometimes confin'd to a narrow Compass, and at other times take a larger Scope. As for their Duration, it is but a few Days, and sometimes only for a few Hours. They are more common in *America* than any were else; but yet *Europe* and *Asia* are not altogether without them, as appears from Histories and Travels.

The Causes of Tempests and Hurricanes are hardly to be accounted for in all Particulars. However, it may in the first Place be noted, that the Ratio of all Liquids is much the same, and therefore an extraordinary Motion may be excited in the Air, by the same Way as in Water.

Now, if Water fall from a high Place, or if there be a Confluence of several Streams together, this gives a violent Motion, and causes many Whirlings and Eddies in it. This is apparent in the Torrents falling down the Rocks, and the Confluence of Rivers.

If therefore something analogous may happen in the Air, there needs must be furious Tempests of Wind rais'd in it. And such a thing may happen, if any extraordinary Quantity of Vapours be drawn by the Wind, upon a certain

a certain Place, which they cannot easily get over, by reason of Mountains or contrary *Winds* which oppose them: For example, Suppose a *Wind* upon some Point between North and East, carries a large Collection of Vapours out of *Africa* into the *Caribbee* Isles, this *Wind* lights upon the Continent of *America*; now it is possible that not only the Mountains and Woods of *Panama* may resist the Current of this *Wind*, and crowd the Vapours together there; but a contrary *Wind* upon a Point between South and West, may blow at the same time upon the western Shoar of *America*, which shall force the Vapours back again. When such a Rencontre happens, there must be a wild Uproar in the Air about the *Caribbee* Islands, and in all that Tract between *South* and *North America*; and the Vapours in this circular Motion must needs be furious on all Sides, just as it is in the Water.

For we see in the Confluence of two Rivers, if their Currents are rapid at the Place where they fall in, they cause violent Eddies, whirl things about that are cast in them, swallowing them up for a little Time, and then throwing them up again.

This shews us the Reason, why heavy Bodies are often tossed in the Air by the whirling of Hurricanes, and then dash'd to the Ground again: For the Air being a circular Motion, is with great Fury tossed backwards and forwards, between the Ground and the Clouds. For as the Waters of the rolling Sea do not run to the Shoars in an even Stream, but in such Waves as dash by Fits and Turns; so the Course of a violent *Wind* is in broken and distinct Blasts.

Such Tempests do not extend very far (though their Bounds are uncertain) because the neighbouring Air giving way to them, they spend themselves in the Progress of their Motion.

Thus when a great Stone is cast into the Water, we see a great Agitation round about the Place where it fell; but the more the Waves retire from the Center of Motion, the slower and the less sensible they grow: And as such Motions do not last long in Water, no more do they in the Air, for the same Reason.

Though there may be unusual Storms of *Wind* any where, the Air and Vapours are drawn together thereabouts by contrary *Winds*; yet they are more frequent about the *Caribbee* Islands, especially in *June* and *August*, when the Sun is vertical there; for their Air being rarefied by the Sun's Heat, the usual *Winds* bring thither a vast Quantity of Air and Vapours, which being crowded together in the Gulf of *America*, cause a great Estuation about the neighbouring Islands.

When the Sun is on this Side the Equator, the Air is more rarefied thereabouts, and it may so happen, that the South-South-East *Wind* which constantly blows beyond the Line, may sometimes transgress its Limits, and bring the Vapours of the *Ethiopic* Sea to the same Place where those of the *Atlantick* are already

gathered; which being kept in by the Shoars of *America*, must necessarily be driven about the *Caribbee* Islands.

Of the Qualities of Winds.

A Wind that blows from the Sea is always moist, in Summer it is cold, in Winter warm, unless the Sea be froze up: This is well demonstrated thus; there is Vapour continually rising out of all Water, (as appears even hence, that a Quantity of Water being left a little while in an open Vessel, is found sensibly diminished) but especially if it be expos'd to the Sun's Rays; in which Case the Evaporation is beyond all Expectation. By this Means the Air incumbent on the Sea becomes impregnated with a deal of Vapour; but the *Winds* blowing from off the Sea, sweep these Vapours along with them; and consequently are always moist.

Again, Water in *Summer*, &c. conceives less Heat than Terrestrial Bodies, expos'd to the same Rays of the Sun; but in *Winter*, Sea Water is warmer than the Earth, cover'd with Frost, Snow, &c. Wherefore, as the Air, contiguous to any Body, is found to partake of its Heat and Cold, the Air, contiguous to Sea Water, will be warmer in *Winter*, and colder in *Summer*, than that contiguous to the Earth: Or thus, Vapours raised from Water by the Sun's Warmth in *Winter*, are warmer than the Air they rise in, as appears from the Vapours condensing and becoming visible almost as soon as they are got out into the Air: Fresh Quantities of Vapours therefore continually warming the Atmosphere over the Sea, will raise its Heat beyond that over the Land.

Again, the Sun's Rays reflected from the Earth into the Air, in *Summer*, are much more than those from the Water into the Air: The Air therefore over the Earth, warmed by the Reflection of more Rays than that over Water, is warmer, — Hence Sea *Winds* make cloudy, hazy Weather.

2. *Winds which blow from the Continent are always dry, in Summer warm, and cold in Winter:* — For there is much less Vapour arising from the Earth, than from Water; and therefore the Air over the Continent will be impregnated with much fewer Vapours: Add, that the Vapours or Exhalations raised by a great Degree of Heat out of the Earth, are much finer and less sensible than those from Water: — The *Wind* therefore blowing over the Continent, carries but little Vapour with it; and is therefore dry.

Further, the Earth, in *Summer*, is warmer than Water expos'd to the same Rays of the Sun: — Hence, as the Air partakes of the Heat of contiguous Bodies, that over the Earth in *Summer*, will be warmer than that over the Water; therefore the *Wind*, &c.

After the like Manner it is shewn, that the Land *Winds* are cold in *Winter*: — Hence we see why Land *Winds* make clear, cold Weather.

Our Northerly and Southerly *Winds*, however, which are commonly esteem'd the Causes of cold and warm Weather, Mr. *Derham* observes, (as we have said) are really the Effects of the Cold or Warmth of the Atmosphere: Hence it is that we frequently see a warm Southerly *Wind*, on a sudden, chang'd to the North, by the Fall of Snow or Hail; and that in a cold, frosty Morning we see the *Wind* North, which afterwards wheels about towards the Southerly Quarters, when the Sun has well warm'd the Air; and again in the cold Evening, turns Northerly or Easterly.

Some *Winds* are drying, others are moist; some gather Clouds, others disperse them; some are warm, others cold; but their Influence is not one and the same in all Places; for such *Winds* as are warm in one Country, are cold in another; those that are wet with us, are dry with other Nations; and on the contrary.

The dry *Winds* are such, as carry but a few Vapours along with them, and therefore lick off the moist Particles from the Bodies over which they pass; and thus in *Holland* the North and East *Winds*, with the intermediate Points, are drying; because the cold Northern Sea yields but few Vapours in Comparison of those that come from warmer Parts of the Ocean; but the westerly *Winds* and others are moist, because they issue from warm and vapourous Parts, the Western *Wind* seldom failing to send Rain.

Such *Winds* gather Clouds, which blow from the Quarters where the Vapours arise, which in conjunction with the Vapours of our own Region, fill the Air: And, on the contrary, those that bring little Vapour along with them, and bear away that which hangs over us, bring fair Weather.

Winds are either warm or cold, as the Countries are from whence they blow; and therefore when a brisk *Wind* blows from a cold Quarter, it allays the Heat of Summer, which is very troublesome in still Weather. Thus a quick Blast of a Pair of Bellows, will put out a Flame, which a gentle Blowing increases; for the quick Blast drives all the Flame to one Side, where it is stifled by the Force of the incumbent Air, for want of Aliment; but a gentle *Wind* augments the Motion of the Flame every way, and makes it seize on more Parts of Fuel.

Now, because all the Heat or Cold of *Wind* proceeds from the Heat or Cold of the Country where it blows; therefore the same *Winds* are cold or hot every where. Beyond the Line, they are just the Reverse of what they are with us; their cold *Winds* are from the South, ours from the North; and as our South *Winds* are warm, from no other Reason, but because they bring us an Air heated by the Sun; for the very same Reason, the North *Winds* are warm to our *Antipodes*.

From what has been said, it is evident that the Sun is the Cause of the *Wind*, and Motion the Cause of Vapours.

There are some, who fancy that the Waters in the Bowels of the Earth are rarefied into

Vapours by the subterraneous Fires, and these Vapours issuing out of the Chinks of the Ground, create the *Wind*; and because the Situation of Mountains is commonly such, as permits those to flow but one Way, therefore they say, the Vehemence of the *Wind* is in such and such a Place.

But these Persons shew no Place whence the Matter of the *Winds* can come with so much Force; though they talk of Caves which are the Store-houses of the *Winds*, yet if it were so, all Places must be full of Caves, whereas we hear but of very few: And besides, in the Places where such Caves are, the same *Winds* would blow continually, or would seldom fail; but this is what was never found yet. See *Atmosphere, Air, Vapour, Hail, Rain, Snow, &c.*

Prognosticks of Weather from the Winds.

The *Winds*, Mr. *Pointer* says, are the Causes of the most sudden and extraordinary Alterations of the Air.

The Nature of the *Winds* is such, that by the Experience we have of them, we may very nearly predict what Weather we shall have for two or three Days after; as for Example, we know that in our Climate, a South *Wind* generally brings Rain, and a west *Wind* more, and the west *Wind* is the predominant *Wind* with us, because the Ocean lies on the west Side of our Country.

And also, that a north *Wind* brings fair Weather to us, as well as the East *Wind*, which does not last so long as the North; therefore the North-east and South-west *Winds* are those that are necessary chiefly to be treated of.

Mr. *Pointer* gives the following Rules to know when the *Wind* will set in one of these two Points, for the most part for two or three Months together. First, as to the North-east *Wind*; when the *Wind* turns to the North-east Point, and continues in it two Days without Rain, and does neither turn to the Southward the third Day, nor rain, then it is likely to continue eight or nine Days without Rain, and then to return into the South.

If the *Wind* turn out of the South to the North-east again, and continues two Days in that Point without Rain, and neither rains nor turns to the South the third Day, it is likely to continue North-east for two Months, and for the most part for three Months. The *Wind* will finish these Turns towards the North in three Weeks time.

Secondly, as to the South-west *Winds*; when the *Wind* has been in the North for two Months or more, and comes to the South, there are usually three or four fair Days at first, and then on the fourth or fifth Day comes Rain, or else the *Wind* turns North, and continues dry still; if within a Day or two, without Rain, it returns to the South, and with Rain turn Northward, and return into the South the first or second Day, as before, two or three times together after this Manner, then it is like to be in the South or South-west

west two or three Months together, for the most part, as it was in the North before: The *Wind* will finish these Turns in a Fortnight.

He does not mention the East or West *Winds*, because he says, the Rains come usually from the South, or in the shifting of the *Wind* from the South to the North: As for the Drought, the *Wind* is, for the most part, North-east.

If it prove fair Weather out of the South for a Week together (which is not usual) it is like to be a great Drought, when it has rained a long Time out of the South before.

The *Wind* usually turns from the North to the South quietly without Rain; but comes back again into the North, with a strong *Wind* and Rain: The greatest *Winds* which blow down Houses and Trees, usually come by the turning of the *Wind* out of the South by the West into the North, which drives away Rain and clears the Air.

Signs of the Changing of the Wind.

Mr. Pointer says, in what Point soever the *Wind* is, when the Sun rises with many pale Spots appearing in its Orb, and part of it hid in a Cloud, it will soon turn to the South.

That when the *Wind* has been settled for Twenty-four Hours or more, in any of the full Points, as North, East, West or South, when it begins to turn, it will not settle till it comes to the opposite Point, as from the North to the South, and so from full East to full West; and so of the angular Points, as from the North-east to the South-west.

Upon whatsoever Quarter the *Wind* is when the Moon changes, it presently changes upon the New Moon.

When the Generality of the Clouds tack with the *Wind* (though there should be many in little Fleeces or long Flakes lying higher) the *Wind* is flagging, and will change soon and shift its Point.

Common Observations and Signs of Winds and Storms arising.

If pale Spots seem to appear in the Orb of the Sun at his setting, and do dazzle there, strong *Winds* from the South will ensue; the *Wind* soon shifting into that Point, in what Quarter soever it was before.

If there appear upon the Sun, when he is setting, fiery Spots, or of a reddish Colour, much *Wind* will ensue; and a red, lowering Morning is frequently a Fore-runner of *Wind*.

If the Moon, when at full, has a reddish Circle about her, it prefaces much *Wind*.

When Meteors, or, as they are commonly called, Stars, shoot and spread a long Train of Light, they are Forerunners of *Winds* that will soon follow.

The Lord Bacon says, the following are Prognosticks of high *Winds* or Tempests arising.

When the Sea resounds upon the Shore, when the *Winds* murmur in the Woods, without any apparent *Wind*, they portend that

Wind will follow; for such *Winds* breathing chiefly out of the Earth, are not first perceived, except they are pent by Water or Wood; and therefore a Murmur out of the Caves likewise portends as much.

When the Brightness of the smaller Stars is on a sudden obscur'd, it is a Sign of a Tempest arising; for the upper Regions of the Air perceive the Matter of the Collection of Tempests and *Winds*, before the Air here below; therefore the obscuring of the smaller Stars, is a Sign of Tempests following.

He says, the Air and Fire have subtle Perception of the rising *Winds* before Men.

We may perceive the Trembling of a Candle will discover a *Wind*, that otherwise we do not feel; and the flexious burning of Flames shews the Air is beginning to be unquiet, and in like manner do Coals of Fire, by casting off the Ashes more than usual; and as for the Ashes it is not to be admired at, if the *Wind*, unperceived, shake them off; for it is a common thing to try which way the *Wind* blows, by throwing up Grass, Chaff, or such like things into the Air.

Signs of the Wind's ceasing.

If a hasty Shower of Rain falls, when the *Wind* has raged for some Hours, it soon abates.

If Water ruckles much, and frequent Bubbles arise, the Storm is but of a short Continuance.

If Sparrows chirp merrily, and Moles come out of their Holes, it is a Sign of the Storm ceasing.

If the Bird called *King's-Fisher*, or *Halcyon*, attempts the Seas when the *Wind* blows hard, it is a Sign of its abating.

Of WINES and vinous Liquors.

WINE is a brisk, agreeable and spirituous Juice, drawn from Vegetable Bodies, and fermented.

Dr. Boerhaave characterizes *Wine*, that the first thing that it affords by Distillation, be a thin, fatty, inflammable, &c. Fluid, called a Spirit; and in this it is distinguished from another Class of fermented Vegetable Juices, viz. Vinegars, which instead of such Spirit, yield for the first thing an acid, uninflamable Matter.

In order to the making *Wines*, it will be of great Advantage to be well acquainted with the Business of Fermentation. This Dr. Boerhaave defines and explains as follows.

Fermentation is a Change produced in Vegetable Bodies, by means of an intestine Motion excited therein; the Effect whereof is this, that the Part which first rises from them in Distillation, is either a thin, fat, acrid, hot, transparent, volatile and inflammable Fluid that will mix with Water; or else a thin, acid, pellucid, less volatile, uninflamable Liquor, capable of extinguishing Fire.

The Liquor obtain'd by means of Fermentation, is called *Tbin*, because none appears to be thinner than the Spirit of fermented Vege-

Vegetables; Acid, because it acts almost like Fire, when apply'd to the Tongue or other Parts of the Body; Volatile, because there appears to be no Liquor, that is raised with greater Ease; but 'tis this Liquor being totally inflammable, and at the same time capable of mixing with Water, that ultimately distinguishes Fermentation from all other Operations in Nature: For neither Putrifaction, Digestion, Effervescence, nor any thing of that kind, will ever afford a Liquor at once possessed of those Qualities.

Putrifaction, indeed, as well as Fermentation, is performed by means of an intestine Motion; but the former will never produce either of the Liquors above describ'd, as the Effects of Fermentation, that is, neither a vinous nor acetous Liquor.

We see then, that there are two different Effects of Fermentation, the Production of an inflammable Spirit, and an uninflammable Acid; and whatever Operation will afford, neither of these Liquors is improperly called Fermentation; which therefore can only take Place in the Vegetable Kingdom: For all the Art in the World, so far as hitherto appears, will never gain such Spirits from Animals or Fossils; and consequently never excite an actual and real Fermentation in them: For Fermentation is the single Operation in Nature, by which such Spirits can be obtain'd.

2 Any Vegetable Liquor so fermented, as to afford the inflammable Spirit above-mentioned, for the first thing in Distillation, we call *Wine*; but if the Liquor be so fermented, as first to afford the Acid, uninflammable one, 'tis called Vinegar; by which we mean every thin, acid, volatile, vegetable Liquor, capable of extinguishing Fire: So likewise under the Name of *Wine*, we include Beer or Ale, Mead or Metheglin, Cyder, Perry, all Sorts of artificial *Wines*, and whatever Liquors afford Spirits possess'd of the Properties before set down.

The like is to be understood of Vinegar, which is obtainable from all the same Bodies that afford *Wine*: So that we have either the *Wine* or Vinegar of all Sorts of Fruits, as of Grapes, Currants, Mulberries, Cherries, &c. all Sorts of Grain, as Barley, Wheat, Oats, &c. all Sorts of Pulse, as Beans, Peas, Tares, &c. all Sorts of Roots, as Turnips, Carrots, Radishes, &c. and in short, of all Sorts of vegetable Substances, even Grass itself.

3. All the Bodies capable of being changed by Fermentation, either into *Wine* or Vinegar, are said to be fermentable Bodies; and because such a Change can only be wrought, so far as we know at present, upon Vegetables, these alone are accounted fermentable.

4. Any Matter which being mixed with a fermentable Body, increases its intestine Motion, or excites or forwards the Fermentation, is called a Ferment: And according to the Doctrine before delivered, nothing can properly be called so; but what will produce either *Wine* or Vinegar.

These fermentable Bodies may be reduced to the following Classes.

The first Class will consist of the mealy Seeds, i. e. all the Grain, which being fully ripe and well dry'd, may be reduced, by grinding, to a light Meal or Flower, that is neither clammy nor unctuous.

The second Class consists of all the Pulpy Summer Fruits, which when ripe, affect the Tongue with the Sense of Acidity and Sharpness, as Apples, Pears, Grapes, Gooseberries, &c. under this Class may be ranged all manner of bulbous pulpy Roots growing in the Ground, if they are but first deprived of their volatile, alkaline Salt, which is apt to determine them to Putrifaction.

The third Class takes in all the juicy Parts of Plants, as the Leaves, Flowers, Stalks and Roots, provided they are not too Oily or too Alkaline, in which Cases Vegetables will rather putrify than ferment.

The fourth Class contains the fresh, expressed and native Juices of all Kinds of Vegetables; to which may be added, all the native, saline Liquors that distil from wounded Plants, as the Tears of the Vine, the Walnut, the Birch-Tree, &c.

Under the fifth Class, come the most perfect of all vegetable Juices, viz. those that are unctuous, condensed and elaborated by Nature herself, such as Honey, Manna, Sugar, and all other Kinds of concreted Juices capable of dissolving in Water.

In order to fit any of the fermentable Bodies for Fermentation, there are several Particulars requisite:

1. Maturity; the Juice of unripe Berries, as of Currants or Gooseberries, for Instance, will scarce be brought to ferment at all; while it is very difficult to hinder their Juice, when fully ripe, from falling spontaneously into Fermentation.

Thus the Juice of unripe Grapes being incapable of fermenting, is a rough, acid Liquor, call'd *Verjuice*, that will for several Years remain in the same unactive State; but after they are come to Maturity, it can no sooner be press'd into the Vessel, than it becomes a fermentable spirituous Fluid.

2. Another Requisite to prepare a Body for Fermentation, is, that it should contain only a moderate Proportion of Oil; for if it either exceeds in the Quantity, or be intirely destitute of Oil, it will never be brought to ferment at all. Thus Almonds, Fennel-Seeds, &c. are always depriv'd of their Oil before they are attempted to be fermented.

3. The Bodies intended for Fermentation must not be too acid or austere; as is plain from the acid Juices of unripe Fruits, which are greatly indispos'd to ferment.

4. The last Thing requir'd to fit and prepare a Body to undergo Fermentation, is the Property of dissolving in Water: For want of which, all acid Bodies, and such Woods, Roots and Herbs as are dry and hard, become unfit for this Operation: For unless the Parts of these Bodies are dissolv'd, the requisite intestine Motion thereof will not ensue; but without such Motion, Fermentation cannot subsist.

Hence

Hence Honey itself can never be made to ferment, whilst it retains its native, thick Consistence; but being dissolv'd by Heat, or let down with Water, it immediately enters the State of Fermentation. On the other hand, so violently as the Juice of Grapes affects this State, yet, if immediately after it is express'd, it be reduc'd, by boiling to the Consistence of a Jelly, it will lie quiet, and never ferment at all, unless it be again diluted, and let down with Water.

Ferments are of two Kinds, the Natural or Spontaneous, and those produc'd by Fermentation.

The spontaneous, or natural Ferments, are,

1. All the fresh express'd Juices of fully ripen'd Plants which easily run into Fermentation.

2. Honey, Manna, Sugar, and the like thick and inspissated vegetable Juices, which cause a strong Fermentation.

3. The Ferments produc'd by Fermentation, are the fresh Flowers or Yeast of any fermenting vegetable Juice or Liquor, as of *Wine*, *Beer*, &c. By Flowers or Yeast is to be understood that light frothy Matter which covers the Surface of the fermenting Liquor in the Nature of a tender Crust, and which being added to any other fermentable Juices will excite a Fermentation in them.

4. The fresh *Fæces*, or Lees of any fermenting Liquor, as of *Wine*, *Ale*, *Beer*, &c. For all Fermentation divides the Liquor, which is the Subject of it, into three Parts, *viz.* the Flowers or Yeast, which possess the uppermost Place; the operating or fermenting Fluid, which lies in the Middle; and the gross and seemingly exhausted Matter, which falling to the Bottom of the Vessel, is known by the Name of *Lees*, *Sediments*, *Fæculence*, or *Mother*, that will, if rais'd again out of the Liquor into which it was precipitated, cause it to work afresh.

Thus when a Hoghead of *Wine* has done fermenting, and is fined down, if the Vessel be any way shook or disturb'd, it will grow turbid again, and ferment anew, as Vintners very well know: For such as were the Flowers in the Act of Fermentation, such is the Mother after the Action is over.

5. Acid Paste or Bakers Leaven, which is no more than any kind of Meal brought into a close Lump by means of Water, after the same manner as common Bread is made, for this being set in a warm Place, during the Space of four or five Days, it will first swell, then turn very acid, and at length become a Ferment.

6. Those Ferments which reside in, or stick to the Sides of the Casks that have contain'd fermenting Liquors; for such Casks will of themselves raise a Fermentation in the Liquors committed to them; and *Helmont* was of Opinion, they might be capable of doing this for ever.

Upon account of this inherent Ferment it is that old season'd Vessels, or such as have been

long employ'd by Vintners or Brewers, bear so great a Price among them.

It is very remarkable, though a thing well known to Brewers and Vintners, that a new Cask checks the Fermentation of vinous Liquors, and renders them weak and spiritless; for which Reason they never chuse to make use of such a Cask before it is season'd, as they call it, by having first contain'd some spirituous or fermented Liquor or other, which being plentifully drank in by the Wood, the original Liquor comes to be depriv'd of a large Proportion of its Spirit and more fermentable Part, whence the Remainder must needs taste flat and vapid.

This is certain, that even Must itself will not easily ferment in a new pure Vessel; but with the greatest Facility, if put into one that has before contain'd fermenting Juices; for the Parts of the fermenting Liquors, with which such a Vessel must have been impregnated, presently rouse and determine it to Action.

7. There are some Ferments that appear to be heterogeneous, or which are improperly call'd Ferments; as the White of an Egg beat into a Froth, which is us'd when the Liquor to be fermented proves too dilute or thin to sustain the Operation: For in this Case, the fermentable Parts of the Fluid easily extricate themselves, and so fly off for want of something to detain and keep them in the Body of the Liquor; which therefore requires some viscid Substance to be mix'd with it, in order to prevent this Avolition of its subtle Parts: And this cannot be more commodiously effected than by the White of Eggs.

8. Of the like heterogeneous kind of Ferments are all fix'd and acid Salts. Thus, if the Liquor design'd for Fermentation be too acid to work kindly, the Addition of an Alkaline Salt, as that of Vine-branches, or any saponaceous Substance, will, by taking off from the Acidity, fit it for, and so promote the Operation; but if the Liquor be of itself too alkaline, then Tartar, or the like, ought to be added to it to promote the Fermentation.

But this does not happen, because either the acid or alkaline Salt is an actual Ferment, as some Chymists have vehemently contended for the Alkaline; because the Salts employ'd, respectively temper and take down the predominant Acid or Alkali, which before hindred the Fermentation of the Liquor.

And if such Salts should in due Quantities be mix'd with any proper Subject of Fermentation, possess'd of all the Qualities before set down, as requisite to it, the Operation would be intirely check'd and prevented; so that alkaline Bodies may as well be said to hinder as promote Fermentation.

9. And lastly; Of the same Sort are certain austere or rough-tasted Substances; as all harsh and green Fruit, Pomegranate-Bark and Flowers, the Tamarisk-Bark, Crab-apples, unripe Medlars, &c. Which when the Liquor design'd for the Fermentation is too much

broken in its Parts, or dissolv'd in its Texture bind it together again by its astringent Quality; so that tho' it was before too thin and aqueous, it is now reduc'd to a proper Consistence for Fermentation.

Thus when Must proves thin and watery, it will not ferment kindly, unless some austere or astringent Ingredient, as Red Rose Leaves, or the like, be added to it to thicken and improve its Consistence, and at the same time prevent the Air it contains from making too easy an Escape.

But when a Liquor is too austere, or its Roughness proves so great, that it cannot ferment, the Addition of a fix'd Alkali, in a proper Quantity, will remove the Obstruction, and leave it at liberty to work.

So likewise when the Operation is prevented by too large a Proportion of Acid in the Liquor, the Method is to throw Chalk, Crabs-Eyes, Bolo Armoniac, or the like, into it; but if it be too unctuous or oily, as is the Case of some *Spanish Wines*, Salt of Tartar is made choice of; and thus, as Circumstances alter, different Bodies are employ'd to stop or promote Fermentation in Liquors.

In order for fitting the Subjects of the second Class for Fermentation, and making vinous Liquors, *viz.* Pulpy *Summer* Fruits, and the Roots of bulbous Plants, in case they prove crude or hard, they are to be first boil'd in Water, and afterwards bruised; which will dispose them for Fermentation: But if such Subjects are juicy, they may be directly ground to a Pulp, or have their Juice press'd from them; or if they are very succulent indeed, there may be no Occasion to bruise them, only directly to commit them to the Press, and squeeze out all their Juice.

But if the Flesh or Substance be strong and tough, it may be proper to rasp, shave, or cut them into small Pieces, which will be of Service in some bulbous Roots, and make them yield their Juice with the greater Ease, and in greater Plenty.

Prepar'd Fruits seldom stand in Need of any thing to make them ferment, for they generally begin to work of their own accord; but if the Weather should prove exceeding cold, or the Operation proceed but languidly, it may not be amiss to quicken it, by adding a small Proportion of a Ferment, as a little Yeast, the Lees or Mother of *Wine*, or even a little new *Wine* may serve the Turn.

The Subjects of the third Class, *viz.* The Succulent Parts of Plants, need only, in order to their Fermentation, be beat to a thick kind of Pulp, while they are fresh, and mix'd with a proper Proportion of Rain-water, that is just enough to dilute them, for if much Water be employ'd, the Spirit will be the weaker for it.

These require but very little Ferment, or none at all, to make them work in the *Summer* Season, and no large Proportion in the *Winter*; but in case any at all be requir'd, nothing will prove more serviceable than Honey or Sugar.

The Subjects of the fourth and fifth Classes, *viz.* The fresh, native Juices and weeping Liquors of Vegetables, with the condensed and unctuous Juices of the same, are to be diluted and let down with Rain-water to a due Consistence, which is then commonly thought to be obtain'd, when the compound Liquor will just keep a new-laid Egg afloat: But some vegetable Juices may naturally be of this very Density or Consistence; and in that Case they will require no Water at all: If any be thicker or denser, they ferment not so kindly; and if thinner or rarer, they afford but a weak Spirit. Thus, in order to ferment Sugar, Treacle, or any common Syrup, we first let down the Matter with Water, to the Consistence above-mention'd; and then, if there be Occasion, put Yeast to it to quicken the Fermentation, and make it proceed kindly.

The Subjects of the fourth Class, *viz.* The prepar'd recent Juices, and spontaneous Tears of Vegetables are so far from requiring any Ferment, that it often proves very difficult to restrain or check the Fermentation they naturally fall into; especially if the Season be warm, and the Juices rich; at most, if the Weather should prove cold, they need only be set in a warm Place to make them work.

The Subjects of the fifth Class, *viz.* The prepar'd or inspissated Juices of Vegetables, require no Ferment at all in the *Summer*, and but a small Proportion in the *Winter*, to set them on working; less than an Ounce of Yeast to twenty Pints of prepar'd Liquor, will usually suffice for that Purpose in the coldest Season: But in hot Countries, or sultry Seasons, these prepar'd Juices, and especially Sugar, are, of themselves, apt to fall into a too violent Fermentation; which therefore ought to be abated by the contrary Means.

All the vegetable Bodies of these several Classes design'd for Fermentation, and prepar'd for it in the foregoing manner, ought, together with their Ferments, to be committed to Casks of Oak already season'd or imbu'd with the same kind of fermented Liquor, or some other consisting of subtil and penetrating Parts: Then those Casks or Vessels having their Bung-holes lightly cover'd with a thin or single Cloth, and being set in a warm Place, the Liquor will ferment.

The Mouths of the Vessels are thus slightly cover'd over, that the Air may have a free Passage in and out at them; for they are here design'd to serve as Vent-holes. And these Vessels are order'd of Wood, because Fermentation is never observ'd to be so well carry'd on in those of glaz'd Earth or Glass; tho', on account of their Transparency, 'tis sometimes perform'd in the latter, that the *Phænomena* may be better observ'd.

The Preparatory Business of Fermentation, hitherto describ'd, has been carry'd on by Art, but Nature must now perform the rest of the Work; so that we are here only concern'd to observe the *Phænomena* which arise in the Operation.

When

When therefore any fermentable Body is prepar'd after the manner above deliver'd, and with its due Proportion of a Ferment, committed to a large strong Glass Vessel, standing in a warm Place ;

1. The whole Body of the Liquor soon begins to swell, heave, rarefy, and send up little Bubbles to the Top of the Vessel, where they burst with an audible Noise, and form into Froth : Now the Liquor which was before transparent, grows opaque, and a violent uninterrupted intestine Motion manifests itself therein.

2. The Parts of the fermenting Fluid appear to be incredibly elastick, and the Motion of them exceeding violent. Indeed, by means of this Property of Fermentation, very terrifying and surprizing Actions may be perform'd. Thus, if an hundred Pints of Must were, on some warm Day in *Autumn*, to be confin'd close in a Vessel of Oak above an Inch thick in the Sides, and made ever so tight and strong with Iron Hoops, yet could not this prevent the working of the Liquor, but in spite of so great a Resistance, it would burst the Vessel, with a Report as loud as that of a Cannon.

And therefore the Way to preserve New *Wine* in the State of Must is, to put it up in very strong, but small Casks, firmly closed on all Sides, by which Means it will be kept from fermenting ; and then it goes by the Name of *Stum* : But if it should happen to fall into Fermentation, the readiest and only Way to stop it, is by the Fume of Sulphur, or something of the like Nature.

Were it not for the Knowledge of this Property of burning Sulphur, the *Wine-Merchants* and *Vintners* might frequently sustain great Damages from the bursting of their Vessels when the Liquor is upon the Fret ; or by some Alteration in the Air, or other Accident, begins to ferment again : But the Smoak of a little common Brimstone, or a lighted Match dipp'd in it, and held under a Cask of *Wine* that is just ready to burst its Hoops, will calm its Fury, and make it subside as suddenly as a Spoonful of Oil thrown into a large foaming Copper of boiling Sugar, takes down its Heat, and prevents the Mischief it might otherwise occasion.

3. A thick Skin or crusty Scurf forms itself on the Surface, thro' which the elastic or fermenting Matter is continually breaking. This Crust appears to be the principal Cause of Fermentation ; for it keeps in, or prevents the spirituous Part of the Liquor from flying off ; and if it be frequently broken, it puts a Check to the Fermentation, and will often intirely stop it, if wholly taken away.

4. This Skin or Crust, which we now call Flowers or Yeast, gradually consumes and precipitates to the Bottom of the Liquor ; in which Case, 'tis call'd by the Name of *Fæces* or *Mother* ; and after this, the Fluid above it immediately becomes transparent again, ceases to hiss and bubble, has a very penetrating, pungent, spirituous or vinous Taste and Scent, with a Mixture of Acidity and Sweetness : And now the Liquor having undergone

the Operation of Fermentation, is become *Wine*.

The Vapour arising from the Liquor, during its Fermentation, ought not to be approach'd too near, or breathed in too great a Quantity, because it is highly poisonous ; and if it prove not mortal, may, at least, render the Person apoplectic or paralytic. We have Accounts in the *French* and *German* Transactions, of People who were immediately struck dead by receiving at the Nose the Fumes that issu'd from large Vessels of *Wine* in the State of Fermentation.

And now, if the Liquor thus fermented be stopp'd down close, it will begin to work or feed upon, and digest its own Lees or Mother, and at length consume them : In which Case we commonly say, the *Wine* begins to ripen ; and afterwards, this Mother shoots to the Sides of the containing Vessel, and there appears in the Form of an essential Salt, which is then call'd *Tartar*.

The Space of Time requir'd for finishing the Fermentation, differs with the subject Matter, the Season of the Year, the Nature of the Place, and other Circumstances ; but 'tis known to be perfectly perform'd by the several *Phænomena* just now mention'd.

As soon as ever the Flowers fall to the Bottom, the Vessel should be bung'd down, otherwise the volatile Parts would fly off, and the fermented Liquor become vapid and flat.

In this State it ought to stand for some Weeks in a cool Place, by which Means it will grow stronger and more liquid ; for during this time it imbibes and consumes its own *Fæces*, which abound in subtil, spirituous Parts, and grows soft, and loses of its Acidity by throwing off its Tartar.

And the longer it is thus suffer'd to stand, the more Strength it gains, or the more Spirit it will yield in Distillation.

Thus, for Instance ; Malt Liquors newly brew'd, afford but a small Quantity of inflammable Spirit ; but if suffer'd to remain for some Weeks in the Vessel, till they become fine and clean, they will yield a much greater Proportion : Tho' to avoid so great an Apparatus of Vessels as would then be requir'd, Malt Liquors, brew'd in order to make Spirits, are seldom kept, but immediately after Fermentation committed to the Still. And hence we are furnish'd with a Reason, why all stale, vinous Liquors are stronger, and inebriate sooner, than such as are new.

The Physical Effects.

The Physical Properties of a vinous Liquor, prepar'd in the manner above-describ'd, are those which follow :

1. It will have an inebriating Quality, when receiv'd into the Body : And nothing is properly possess'd of this Quality but what has been first fermented.

For if a Person should eat ever such a Quantity of Grapes, or drink ever so freely of Must, he might, indeed, bring a Looseness upon himself by that means, but he would not be fuddled.

fuddled. So likewise to take down large Draughts of sweet Wort, or the Tincture of Malt, might throw one into a violent Vomiting and Flux, but never produce the Symptoms of Drunkenness.

And whatever some pretend, as to *Mandrake*, *Hemlock*, *Poppies*, *Opium*, and the like, the Effects they have upon the human Body are rather stupifying than inebriating: But Drunkenness is different from Stupification.

An Over-dose of vinous Liquors makes a Man brisk, lively, and joyful, or disposes him to sing, dance, and be merry; at length however, his Legs will not support him: And, if the Fit be violent, he grows furious, raving or paralytick, and so he dies.

But Opium has not these Effects; it brings on a profound Sleep; and he who has taken too much of it, dies lethargick.

2. Wine has the Faculty of heating the Body. Nothing appears to cool the Body more than *Currants*, yet the *Wine* prepar'd from them is very heating. The like is to be understood of *Cherries*, and all fermentable Bodies, tho' ever so cold; for these will afford a vinous Liquor.

3. It is inflammable, and will mix with Water.

4. It contains Tartar, and affords it after the Fermentation is over. This Tartar is the essential Salt of the Vegetable made use of, and differs from the Lees or Mother, being resolvable by Distillation into a Water, a Spirit, two kinds of Oil, an alkaline Salt and Earth. All fermented Vegetables afford it. Must yields a feculent Salt, and no Tartar; but if once it works, so as to become pure *Wine*, it will, in the Space of half a Year, throw off a clean Tartar; which therefore appears to be the Effect of a perfect Fermentation, and accordingly is never obtain'd without it.

5. It retains neither the Colour, Taste nor Smell of the Specifick Vegetable from which it is made. Thus we have seen, that *Rosemary* affords a quite different Water after it has been fermented, from what it did before. Thus fermented *Hydromel*, *Malt Liquors*, *Treacle*, *Sugar*, &c. yield Spirits by Distillation that cannot be distinguished from one another.

The Grapes of some Countries are as sweet as Honey, and so is their Must before Fermentation; yet the *Wine* prepar'd from either, may have little or no Sweetness, and sometimes even gain a Degree of Acidity. It is not easy to believe, that *Rhenish Wine* should proceed from so sweet a Grape as it does.

6. It acquires a somewhat acid and spirituous Taste and Smell. The Taste of Honey or Malt, &c. is sweet, and their Scent scarce perceivable before you commit them to Fermentation; but after having undergone that Operation, they are less sweet, but sharper upon the Tongue, and affect the Nose with a brisk, spirituous or vinous Odour.

7. It contains the volatile Salt and Oil of the Vegetable, attenuated, and reduc'd into

one Spirit; as may appear by the Chymical Analysis of a fermented Subject.

8. It renders the Oil of the Vegetable more volatile than the Water: When an unfermented Vegetable is distill'd, the first thing that comes over is Water, and the next the Essential Oil; but the contrary is observ'd after Fermentation: For by that Operation, the Oil is render'd more volatile than the Water; and therefore rises first in Distillation, having been broke and ground so fine by the preceding Operation, as now to come over the Helm, not in its own Form, as before; but as the finest and most volatile Part of the fermented Liquor, capable of uniting with Water.

The Things that promote Fermentation, are;

1. *Rest*; by means of which the Crust on the Surface may remain unbroken: For 'tis this Crust that prevents the spirituous Part from flying off.

2. *A free Admission of the external Air*, so that it may come at the internal Parts of the fermenting Fluid: For, according to Mr. Boyle, if a fermenting Liquor be put into his exhausted Receiver, the Operation immediately ceases.

3. *A moderate Degree of Warmth*; for too great Heat, and too great Cold are the Bane of Fermentation.

4. *A proper Season of the Year*; that is, when the Vegetables of the same Species, with that made use of, are in their Bloom, for it is then their Juices are most in Motion: Accordingly we find, when Vines are in the Blossom, the *Wines* of former Growths will again spontaneously run into Fermentation. When these several Conditions meet, Fermentation is perform'd to the best Advantage.

The Things which check or hinder Fermentation, are;

1. Too large a Proportion of acid Salts; such as Spirit or Oil of Vitriol, Oil of Sulphur per Campanam, Spirit of Salt, &c. Thus when any Liquor ferments too violently, a few Drops of Oil put into it, or the burning a little Sulphur under or near the Vessel, will immediately check and restrain its Fury.

2. An over Proportion of fixed Alkalies; such are Salt of Tartar, Pot-Ashes, or saponaceous Bodies.

3. *Terrestrial Alkalies*; as Chalk, Marl, Crabs Eyes, &c.

4. A close stopping up of the Vessel.

5. A great Degree of Cold.

6. A violent Degree of Heat or constant Motion, so as to thicken the fermenting Liquor, and render its Parts hard to be separated.

7. A total Extraction of the Air.

8. A violent Compression of the Air in the Vessel; which Mr. Boyle has shewn, will stop Fermentation, as well as taking out the Air by means of his pneumatick Engine.

Some short general Directions as to the Making of Wines.

Wine is made of Grapes, by stamping them in a Vat, or crushing and expressing the Juice out

out of them in a Press, and then fermenting, &c.

In the Southern Parts of *France*, their Method is for *Red Wines*, to tread the Grapes, or squeeze them between their Hands, and to let the Whole stand, Juice and Husks, till the Tincture be in Colour as they would have it, and then they press it: But for *White Wines*, they press the Grapes immediately.

When they have been pressed, they tun the Must, and stop up the Vessel, leaving the Cask empty about the Depth of half a Foot or better, to give Room for its working.

At the End of ten Days they fill this Space with some other proper *Wine*, that will not provoke it to work again, repeating this every ten Days for some Time; new *Wine* spending itself a little before it be perfect.

About *Paris*, and in the Northern Parts of *France*, they let the Marc and Must stand two Days and Nights for *White Wines*, and at least a Week for *Claret Wines*, before they tun it; and while it continues working, they keep it as warm as possible.

Some, upon stopping it up for good and all, roll the Cask about the Cellar to mix it with the Lees; and after it has been settled a few Days, rack it off with great Improvement.

To fine it down, they put in Shavings of green Beach into the Cask; but they first take off all the Rind, and boil them an Hour in Water, to extract their Rankness, and afterwards dry them in the Sun or an Oven. A Peck of these will serve for an Hoghead of *Wine*: They put it in a gentle working, and purify it in twenty-four Hours; they also give it an agreeable Flavour.

Some sweeten their *Wines* with Raisins of the Sun, trod in the Vat with the Grapes, they having been first plump'd by Boiling: Others by boiling half the Must, scumming it, and tuning it up hot with the other.

Wine is distinguished from the several Degrees and Steps of its Preparation into

1. *Mere-gutte*, Mother-drop; which is the Virgin *Wine*, or that which runs of itself out of the Tap of the Vat before the Grapes are trodden.

2. The *Must*, *Surmoult* or *Stum*, which is the *Wine* or Liquor in the Vat after the Grapes have been trodden in the Vat.

3. The *press'd Wine*, or *Vin de pressurage*, which is that squeez'd with a Press out of the Grapes half bruised by treading.

4. *Boisson* or *Draught Wine*. This is made of the Husks left of the Grapes, which are call'd *Rape* or *Marc*: By throwing Water upon which, and pressing afresh, they make a Liquor for Servants.

Wines are also distinguished into

Vin Poux or *Sweet Wine*, which is that which has not yet work'd nor boil'd.

Bouru; that which has been prevented working, by casting in cold Water.

Vin of the Curve, or *work'd Wine*, i. e. that which has been let to work in the Vat to give it a Colour.

Vin Cuit, i. e. *boil'd Wine*, that which has had a Boiling before it work'd, and which by that means still retains its native Sweetness.

Vin Passe, i. e. *strained Wine*; that which is made by steeping dry Grapes in Water, and letting it ferment of itself.

The Goodness of *Wine* consists in its being net, dry, clear, fine, brisk, without any Taste of the Soil, of a clean, steady Colour; in its having a Strength, without being heady; a Body without being sour; and its keeping without growing hard.

After *Wines* have been made, they require to be managed according to their different State and Circumstances. We shall therefore consider them under these four general Heads following:

1. The natural Purification or Clarification of *Wines*, whereby of themselves they pass from the State of Crudity and Turbulency, to that of Maturity by degrees, growing clear, fine and potable.

2. The unseasonable Workings, Frettings, and other Sickneses, to which from either internal or external Accidents, they are afterwards subject.

3. Their State of Declination or Decay, wherein they degenerate from their Goodness, and Pleasantness, becoming pall'd, or turning into Vinegar.

4. The several Artifices used to them, in each of these States and Conditions. As to the first, viz. The natural Clarification of new *Wines*, two Things occur, which deserve Consideration, the Manner how and the Cause by which the same is effected.

As for the Manner, it is to be observed that *Wine*, while yet in the Must, is usually put into open Vessels; the Abundance and Force of the Spirits, i. e. the more subtle and active Parts therein contained, being then so great, as not to endure being imprisoned in close ones, at which time it appears troubled, thick and feculent: All Parts or Elements of it being violently moved and agitated, so that the whole Mass of the Liquor seems to boil like Water in a Cauldron over the Fire.

This Tumult being in some degree compos'd, and the *Gas Sylvestre* (as *Van Helmont* calls it) or wilder Spirit sufficiently evaporated, they then pour the Must into close Vessels, there to be farther defecated by Continuance of the same Motion of Fermentation, reserving the Froth or Flower of it; and putting the same into small Casks hooped with Iron, lest otherwise the Force of it might break them.

This Flower thus separated, is what they call *Stum*, either by Transposition of the Letters in the Word *Must*, or from the Word *Stum*, which in high *Dutch* signifies Mute, because this Liquor (as one may say) is hindered from that Maturity by which it should speak its Goodness and Wholsomeness.

This being done, they leave the rest of the *Wine* to finish its Fermentation; during which, it is probable, that the spirituous Parts impel and diffuse the grosser and feculent Parts up and down in a confus'd and tumultuous manner, until all being disposed in their proper

Regions, the Liquor becomes more pure in Substance, more transparent to the Eye, more piquant and gustful to the Palate, more agreeable to the Stomach, and more nutritive to the Body.

The Impurities being thus separated from the Liquor, are, upon Chymical Examinations, found to consist of *Salt*, *Sulphur* (each of which is impregnate with some Spirits) and much *Earth*. Which being now dissociated from the purer Spirits, either mutually cohere, coagulate, and affix themselves to the Sides of the Vessels, in form of a stony Crust, which is call'd *Tartar* and *Argol*, or sink to the Bottom in a muddy Substance, like the Grounds of Ale or Beer, which is call'd the *Lees* of *Wine*: And this is the Process of Nature in the Clarification of all *Wines*, by an orderly Fermentation.

As for the principal *Agent* or *efficient Cause* of this Operation, it seems to be no other but the *Spirit* of the *Wine* itself: Which, according to the Mobility of its Nature, seeking after Liberty, restlessly moving every way in the Mass of the Liquor, thereby dissolves that common Tye of Mixture, whereby all the heterogeneous Parts thereof were combined and blended together; and having gotten itself free, at length abandons them to the Tendency of their Gravity and other Properties. Which they soon obeying, each Kind comforts with their like, and betaking themselves to their several Places or Regions, leave the Liquor to the Possession and Government of its noblest Principle the Spirit. For this Spirit, as it is the Life of the *Wine*, so doubtless it is also the Cause of its Purity and Vigour, in which the Perfection of that Life seems to consist.

From the *natural* Fermentation of *Wines*, we pass to the *accidental*; from their State of *Soundness*, to that of their *Sickness*, which is the second general Head.

We have the Testimony of Experience, that frequently, even those *Wines* that are Good and Generous, are invaded by unnatural and sickly Commotions, or (as the Wine-coopers call them) *Workings*; during which they are turbulent in Motion, thick of Consistence, unsavoury in Taste, unwholesome in Use; and after which they undergo sundry Alterations for the worse.

The *Causes* of this may be either *Internal* or *External*.

Among the *Internal*, the chief Place may be assign'd to the excessive Quantity of *Tartar* or of *Lees*, which contain much *Salt* and *Sulphur*, and continually send forth into the Liquor abundance of quick add active Particles, that like *Stum* or other adventitious Ferment, put it into a fresh Tumult or Confusion, which, if not in Time allayed, the *Wine* either grows rank or pricking, or else turns sour, by reason that the *Sulphur* being too much exalted above the rest of the Elements or Ingredients, predominates over the pure Spirits, and infects the whole Mass of Liquor with *Sharpness* or *Acidity*: Or else it comes to pass, that the Spirits being spent and flown away in the

Commotion, and the Salt dissolved and set afloat, obtains the Mastery over the other similar Parts, and introduceth *Rankness* or *Ropiness*.

Nay, if those Commotions chance to be suppress'd before, the *Wine* is thereby much deprav'd; yet do they always leave such ill Impressions, as more or less alienate *Wine* from the Goodness of its former State, in Colour, Consistence and Taste.

For hereby all *Wines* acquire a deeper Tincture, *i. e.* a thicker Body or Consistence; *Sacks* and *White Wines* changing from a clear White to a cloudy Yellow; and *Claret* losing its bright Red for a dusky Orange Colour, and sometimes for a Tawny. In like manner they degenerate also in Taste, and affect the Palate with Foulness, Roughness and Rancidity very unpleasant.

Among the *External* are commonly reckoned the too frequent or violent Motion of *Wines*, after their Settlement in their Vessels; immoderate Heat, Thunder, or the Report of Cannon, and the Admixture of any exotick Body, which will not symbolize or agree and incorporate with them, especially the Flesh of *Vipers*, which has been frequently observ'd to induce a very great *Acidity* upon even the sweetest and fullest bodied *Malaga* and *Canary Wines*.

Yet all these foreign Accidents may be accounted rather *Occasions* than *Causes* of the ill Events that follow upon them; because these Events seem to arise immediately and principally from the Commotion and Diffusion of the *sulphureous* and *saline* Impurities formerly separated from the Liquor, and kept in due Subjection by the genuine and benign Spirits.

This brings us, in the next Place, to the third previous Thing considerable, *viz.* the *palling* or flatting of *Wines*, and their declining towards *Vinegar*, before they have attained to their State of Maturity and Perfection.

Of this the greatest and nearest Cause seems to be their *Jejuneness* and *Poverty* of Spirits, either Native or Adventitious.

Native, when the *Grapes* themselves are of a poor and hungry Kind, or gathered unripe, or nipt by early Frosts, or half starved in their Growth, by a dry and unkindly Season, or too full of watery Parts.

Adventitious, when the Liquor, rich, perhaps, and generous enough at first, comes afterwards to be impoverished by Loss of Spirits, either by *Oppression*, or by *Exhaustion*.

The Spirits of *Wine* may be *oppressed*, when the Quantity of Impurities or Dregs, with which they are combined, is so great, and their Crudity, Viscosity and Tenacity so stubborn, that they can neither overcome them, nor deliver them from their Adhesion; but are forced to yield to the Obstinacy of the Matter on which they should operate, and so to remain unactive and clogg'd. As may be exemplified in the coarse *Wines* of *Moravia*, which, by reason of their great Austerity and Roughness, seldom attain to a due Exaltation of their Spirits, but still remain turbulent, thick, and in a State of Crudity, and therefore

fore easily pall, in which respect they are condemned by some *German* Physicians, as bad for generating the Scurvy, and administering Matter for the Stone and Gout; they yielding more of Tartar than other *Wines*.

The Spirits of *Wine* may be exhausted or consumed, either suddenly or gradually. Suddenly, by *Lightning*, which spoils *Wine* (as may be conceived) at least, not by *Congelation* or Fixation of its Spirits; for then such *Wines* might be capable of being restored by such means as are apt to reinforce and volatilize the Spirits again, contrary to what hath been found by Experience, but perhaps by *Disgregation*, and putting them to Flight, so as to leave the Liquor dead, pall'd, and never to be revived by any Supply.

Gradually, two Ways, viz. by *unnatural Fermentation*; of the ill Effects of which, something has been already said: Or by *Heat* from without; of which, we have an Instance in the making of *Vinegar*; which commonly is done by setting the Vessels of *Wine* against the hot Sun; which, beating upon the Mass of Liquor, and rarefying the finer Parts thereof, gives Wings to the fugitive Spirits to fly away together with the purer and more volatile *Sulphur*, leaving the Remainder to the Dominion of the Salt, which soon debaseth and infecteth it with *Sourness*.

This being the common manner of turning *Wine* into *Vinegar*, in all Ages and all Countries, it may be doubted whether Spirit of *Wine* may be drawn out of *Vinegar*, notwithstanding it hath been delivered as Practical by *Sennertus* himself.

The Times of the Year when *Wines* are observ'd to be most prone to Ferment and Fret, and then to grow *Qually* (as it is call'd) that is, Turbulent and Foul, are *Midsummer* and *Albion Tide*; when our Vintners are wont to rack them from their gross Lees, especially *Rbenish*, which commonly grows sick in *June*, if not rack'd; and they chuse to do it in the Wane of the Moon and fair Weather, the Wind being Northerly.

Having thus succinctly recounted the most remarkable Distempers of *Wines*; guessed at their respective Causes, and touch'd upon the Times, it is proper to proceed to their usual Remedies; such, at least, as may be collected from *Wine-Coopers* and *Vintners*, which is the fourth and last Part proposed to be treated of.

To begin therefore with some of the *Artifices* used to *Wines* when yet in *Must*; it is observable, that tho' to raising a Fermentation in them at that Time, there is not so much need of any additional Ferment, as there is in the Wort of *Ale*, *Beer*, *Hydromel*, *Metheglin* and other Sorts of Drinks familiar to us in *England*; because the Juice of the Grape is replenish'd with generous Spirits, sufficient of themselves to begin that Work; yet it is usual in some Countries to put quick *Lime* either upon the *Grapes*, when they are pressing, or into the *Must*; to the end that by the Force and Quickness of its saline and fiery Particles, the Liquor may be both accelerated and assisted in Working.

For the same Reason, perhaps, it is, that the *Spaniards* mix with their *Wines*, while they are yet flowing from the *Press*, a certain thing they call *Gieffo*, which, probably, is a Kind of *Gypsum* or *Plaster*, whereby the *Wines* are made more durable, of a paler Colour, and pleasanter Taste: Others put into the Cask Shavings of *Fur*, *Oak*, or *Beech*, for the same Purpose; and others *Vinegar*.

Again, tho' the first Fermentation succeeds generally well, so that the whole Mass of Liquor is thereby delivered from the gross Lee; yet sometimes it happens, either thro' Scarcity of Spirits at first, or through immoderate Cold, that some Part of those Impurities remain confused and floating therein.

Now, in this Case, *Wine-Coopers* put into the *Wine* certain things to hasten and help its Clarification; such as, being of gross and viscous Parts, may adhere to the floating Lee, and sinking, carry it with them to the Bottom; of which sort are, *Ising-glass* and the Whites of Eggs: Or such, as meeting with the grosser and earthy Particles of the Lee, both dissociate and sink them by their Gravity; of which kind are, the Powders of *Alabaster*, *Calcin'd Flints*, *White Marble*, *Rock Allum*, &c.

The Clarification of *Ippocras* is usually expedited by putting into it new *Milk*; which, after a short Space of Time, separates and sinks of itself, carrying with it the Powders of the Species, and grosser Parts of the *Wine*, after the manner of things that clarify Liquors by way of Adhesion.

The *Grecians*, at this Day, have a peculiar way of spurring Nature, in Fining and Ripening their strongest and most generous *Wines*; and this is done, by adding to them, when they begin to work, a proportionate Quantity of *Sulphur* and *Alum*; not (as it is very probable) to prevent their fuming up to the Head, and inebriating, according to the Conjecture of that great Man the Lord St. Albans; for notwithstanding this Mixture, they cause Drunkenness as soon, if not sooner, than other *Wines*; nor are Men intoxicated by the Vapours of *Wine* flying up immediately from the Stomach into the Brain; but only to excite and promote Fermentation, and hasten their Clarification that ensues thereupon; the *Sulphur*, perhaps, helping to attenuate and divide those gross and viscid Parts, wherewith *Greek Wine* abounds; and the *Alum* conducing to the speedier Precipitation of them afterwards. And a learned Traveller relates, that some Merchants put into every Pipe of their *Greek Wine*, a Gill, or thereabouts, of the Chymical Oil of *Sulphur*, in order to preserve it the longer clear and sound.

Which, tho' it is very probable, because the *Sulphur* is known to resist Putrefaction in Liquors, yet one would decline the Use of *Wines* so preserved, unless in Time of Pestilential Infection.

But of all ways of the hastening the Clarification and Ripening *Wine*, none seems to be more easy, or less noxious, than that borrowed from one of the Antients by the Lord Chancellor *Bacon*, which is by putting the

the Wine into Vessels well stopped, and letting it down into the Sea.

But how shall we reconcile this Experiment to that common Practice of both the Antients and Moderns, of keeping *Wine* in the *Must* a whole Year about, only by sinking the Cask for thirty or forty Days in a Well or deep River?

That this Practice was very antient, is manifest from that Discourse of *Plutarch quæst. Natur.* 27. about the Efficacy of Cold upon *Must*; whereof he gives this Reason, That Cold, not suffering the *Must* to ferment, by suppressing the Activity of the Spirits therein contained, conserveth the Sweetness thereof a long Time. Which is not improbable, because Experience teaches, that such who make their Vintage in a rainy Season, cannot get their *Must* to ferment well in a Vault, unless they cause great Fires to be made near the Casks; the Rain mixed with the *Must*, together with the ambient Cold, hindering the Motion of Fermentation, which arises chiefly from Heat.

That the same is frequent at this Day also, may be collected from what Mr. Boyle has observ'd in his *History of Cold*, on the Relation of a *Frenchman*, viz. that the Way to keep *Wine* long in the *Must* (in which the Sweetness makes many to desire it) is to tun it up immediately from the Press; and, before it begins to work, to let down the Vessels, closely and firmly stopped, into a Well or deep River, there to remain for six or eight Weeks; during which Time, the Liquor will be so confirmed in its State of Crudity, as to retain the same, together with its Sweetness, for many Months after, without any sensible Fermentation.

But it may be objected, how can these two so different Effects, the Clarification of *New Wine*, and the Conservation of *Wine* in the *Must*, be derived from one and the same Cause, the Cold of the Water?

But this may be conceiv'd without much Difficulty; for it seems not unreasonable that the same Cold, which hinders *Must* from Fermenting, should yet accelerate and promote the Clarification of *Wine* after Fermentation: In the First, by giving a Check to the Spirit before it begins to move and act upon the crude Mass of Liquor, so that it cannot in a long Time after recover Strength enough to work: In the Latter, by keeping in the pure and genuine Spirit, otherwise apt to exhale; and rendering the flying Lee more prone to subside, and so making the *Wine* much sooner clear, fine, and potable. Thus much concerning the Helps of *New Wine*.

The general and principal Remedy for the preternatural or sickly Commotions incident to *Wines* after their first Clarification, and tending to their Impoverishment or Decay, is Racking, i. e. drawing them from their Lees into fresh Vessels.

Which yet being sometimes insufficient to preserve them, *Vintners* find it necessary to pour into them a large Quantity of *New Milk*; as well to blunt the Sharpness of the sulphure-

ous Parts now set afloat and exalted, as to precipitate them, and other Impurities, to the Bottom, by Adhesion.

But taught by Experience, that by this means the genuine Spirits of the *Wine* also are much flatted and impaired; (for the Lee, tho' it makes the Liquor turbid, doth yet keep the *Wine* in Heart, and conduce to its Duration) therefore lest such *Wines* should pall and die upon their Hands, as of Necessity they must, they draw them for Sale as fast as they can vend them.

For the same Disease they have divers other Remedies, particularly accommodated to the Nature of the *Wine* that needs them: To instance in a few;

For *Spanish Wines* disturbed by a flying Lee, they have this Receipt. Make a *Parell* (as they call it) of the Whites of Eggs, Bay Salt, Milk and Conduit Water; beat them well together in a convenient Vessel; then pour them into the Pipe of *Wine*, (having first drawn out a Gallon or two to make Room) and follow off the Froth very clean: Hereby the Tumult will in two or three Days be compos'd, the Liquor refin'd, and the *Wine* drink pleasantly, but will not continue to do so long; and therefore they advise to rack it from the milky Bottom, after a Week's Settlement, lest otherwise it should drink foul, and change Colour.

If Sacks or *Canary Wines* chance to boil over, draw off four or five Gallons; then putting into the *Wine* two Gallons of Milk, from which the Cream hath been skimmed, beat them till they be thoroughly mix'd together, and add a Penny-worth of *Rock Allum*, dry'd in a Fire-shovel, and powdered, and as much of *white Starch*; after this take the Whites of eight or ten Eggs, a Handful of Bay Salt; and having beaten them together in a Tray, put them also into the *Wine*, filling up the Pipe again, and letting the *Wine* stand two or three Days, in which Time the *Wine* will recover to be fine and bright to the Eye, and quick to the Taste; but you must be sure to draw it off that Bottom soon, and spend it as fast as you can.

For *Claret*, in like manner distempered with a flying Lee, they make use of this Artifice.

They take two Pounds of the Powder of Pebble Stones, baked in an Oven, the Whites of ten or twelve Eggs, a Handful of Bay Salt; and having beaten them well together in two Gallons of the *Wine*, they mix them with that in the Cask, and after two or three Days draw off the *Wine* from the Bottom.

The same *Parell* serves also for *White-wines* upon the Fret, by the Turbulency and Rising of their Lee.

To cure *Rhenish* of its Fretting (to which it is most prone a little after *Midsummer*, as was before observed) they seldom use any other Art but giving it Vent, and covering the oaken Bung with a Tile or Slate; from which they carefully wipe off the Filth purged from the *Wine* by Exhalation; and after the Commotion

motion is by this means compos'd, and much of the fretting Matter cast forth, they let it remain quiet for a Fortnight or thereabouts, and then rack it into a fresh Cask, newly fumed with a sulphurated Match.

As for the various *Accidents* that frequently ensue and vitiate *Wine*, (after those before-mentioned Reboilings, notwithstanding their Suppression before they were incurable); you may remember they have all been referr'd to such as alter and deprave *Wines*, either in *Colour* or *Consistence*, or *Taste* or *Smell*. Now for each of these *Maladies* our *Vintners* are provided of a Cure.

To restore *Spanish* and *Austrian Wines* grown yellow or brownish, they add to them sometimes *Milk* alone, and sometimes *Milk* and *Isinglass* well dissolv'd therein; sometimes *Milk* and white *Starch*; by which they force the exalted *Sulphur* to separate from the *Liquor*, and sink to the Bottom; so reducing the *Wine* to its former Clearness and Whiteness.

The same Effect they produce with a Composition of *Flower-de-Luce* Roots and *Salt Petre*, of each four or five Ounces; the Whites of eight or ten Eggs, and a competent Quantity of common *Salt*, mix'd and beaten in the *Wine*.

To amend *Claret* decay'd in *Colour*, first they rack it upon a fresh *Lee*, either of *Alicant* or red *Bordeaux Wine*; then they take three Pounds of *Turnsole*, and steep it all Night in two or three Gallons of the same *Wine*, and having strained the Infusion through a Bag, they pour the Tincture into the *Hoghead* (sometimes they suffer it first to fine itself in a *Rundlet*), and then cover the Bung Hole with a *Tile*, and so let it stand for two or three Days; in which Time the *Wine* usually becomes well coloured and bright.

Some use only the Tincture of *Turnsole*.

Others take half a Bushel of full ripe *Elder-Berries*, pick them from their Stalks, bruise them, and put the strained Juice into a *Hoghead* of discoloured *Claret*; and so make it drink brisk, and appear bright.

Others, if the *Claret* be otherwise sound, and the *Lee* good, over-draw three or four Gallons, then replenish the Vessel with as much good *Red-wine*, and roll him upon his Bed, leaving him reversed all Night; and then next Morning they turn him again, so as the Bung Hole may be uppermost, which stoppt, they leave the *Wine* to fine.

But in all these Cases they observe to set such newly recovered *Wines* abroach the very next Day after they are fined, and to draw them for Sale speedily.

To correct *Wines* faulty in *Consistence*, i. e. such as are *lumpish*, *foul*, or *ropy*,

They generally make use of the Powders of *burnt Allum*, *Lime*, *Chalk*, *Plaster*, *Spanish white calcin'd Marble*, *Bay Salt*, and other the like Bodies, which cause a *Precipitation* of the gross and viscid Parts of the *Wine* then afloat: as for Example;

For *Attenuation* of *Spanish Wines* that are foul and *lumpish*, having first rack'd them into a newly scented Cask, they make a *Parrell*

of *burnt Allum*, *Bay Salt*, and *Conduit Water*; then they add to these a Quart of *Bean Flower* or *Powder of Rice*, (and if the *Wine* be always brown and dusky, *Milk*, otherwise not) and beating all these well together with the *Wine*, blow off the Froth, and cover the Bung with a clean *Tile* or *Stone*. Lastly, they again rack the *Wine* after a few Days, and put it into a Cask well scented.

The manner of scenting Casks is as follows:

They take four Ounces of *Brimstone*, one Ounce of *burnt Allum*, two Ounces of *Aqua Vitæ*; these they put together in an earthen Pan or *Pipkin*, and hold them over a Chafing Dish of glowing Coals, till the *Brimstone* is melted and runs; then they dip therein a little Piece of new *Canvas*, and instantly sprinkle thereon the Powders of *Nutmegs*, *Cloves*, *Coriander*, and *Anise-Seed*s. This *Canvas* they fire, and let it burn out in the Bung-Hole, so as the Fume may be received into the Vessel; and this is said to be the best Scent for all *Wines*.

To prevent the Foulness and Ropiness of *Wines*, the *Old Romans* us'd to mix *Sea Water* with their *Must*.

To Cure the Ropiness of *Claret*, the *Vintners*, as well *French* as *English*, have many Remedies; of which these that follow are the most usual.

First, they give the *Wine* a *Parrell*, then draw it from the *Lee*, after the Clarification by that *Parrell*; this done, they infuse two Pounds of *Turnsole* in good *Sack* all Night, and the next Day putting the strain'd Infusion into a *Hoghead* of *Wine* with a Spring Funnel, leave it to fine, and after draw it for excellent *Wine*.

Another is this; They make a *Lee* of the Ashes of *Vine Branches*, or of *Oaken Leaves*, and pour it into the *Wine* hot, and after stirring, leave it to settle. The Quantity of a Quart of *Lee* to a Pipe of *Wine*.

A third is only *Spirit of Wine*; which, put into a muddy *Claret*, serves to the refining it effectually and speedily; the Proportion being a Pint of *Spirit* to a *Hoghead*; but this is not to be used in sharp and eager *Wines*.

When *White-wines* grow foul and tawny, they only rack them on a fresh *Lee*, and give them Time to fine.

For the mending of *Wines* that offend in *Taste*, *Vintners* have few other Correctives, but what conduce to *Clarification*; nor do they indeed much need Variety in the Case, seeing all Unfavourableness of *Wines* whatever proceed from their Impurities set afloat, and the Dominion of others, their sulphureous or saline Parts over the finer and sweeter, which Causes are remov'd chiefly by *Precipitation*.

For all *Clarification* of *Liquors* may be referr'd to one of these three Causes;

1. Separation of the grosser Parts of the *Liquor* from the finer.
2. The equal Distribution of the *Spirits* of the *Liquor*, which always renders Bodies clear and untroubled.
3. The refining of the *Spirit* itself.

And the two latter are Consequents of the first, which is effected chiefly by Precipitation, the Instruments whereof are Weight and Viscosity of the Body mix'd with it, the one causing it to cleave to the gross Parts of the Liquor flying up and down in it, the other sinking them to the Bottom.

But this being more than Vintners commonly understand, they rest not in Clarification alone, having found out certain Specifics, as it were, to palliate the several Vices of *Wines* of all Sorts, which make them disgusting. Of these I shall recite two or three of the greatest Use and Esteem among them.

To correct *Rankness*, *Eagerness*, and *Prickling* of *Sacks*, and other sweet *Wines*, they take twenty or thirty of the whitest Limestones, and slack them in a Gallon of the *Wine*; then they add some more *Wine*, and stir them together in a half Tub with a Parel-ling-staff; next they pour this Mixture into the Hogshead, and having again used the parelling Instrument, leave the *Wine* to settle, and then rack it.

This *Wine* may probably be no ill Drink for gross Bodies and Rheumatick Pains, but injurious to Good Fellows of a hot and dry Constitution and meagre Habits.

Against the *Prickling* of *French Wines*, they prescribe this easy and cheap Composition. Take of the Powder of *Flanders Tile* one Pound, of *Roch-Allom* half a Pound, mix them, and beat them well with a convenient Quantity of *Wine*, then put them into the Hogshead, as the former.

When their *Rhenish Wines* prick, they first rack them off into a clean and strongly-scented Cask, or Vat; then they add to the *Wine* eight or ten Gallons of clarify'd Honey, with a Gallon or two of Skim-milk, and beating all together, leave them to settle.

Sometimes it happens that *Claret* loses much of its Briskness and Piquantness; and in such Case they rack it upon a good Lee of *Red-wine*, and put into it a Gallon of Sloes or Bullace, which after a little Fermentation and Rest, makes the *Wine* drink brisk and rough.

To meliorate the Taste of hungry and too eager *White-wines*; they draw off three or four Gallons of it, and infusing therein as many Pounds of *Malaga Raisins* ston'd, and bruis'd in a Stone Mortar 'till the *Wine* has sufficiently imbib'd their Sweetness and Tincture (which it will do in a Day's Time) they run it through an Hippocras-bag, then put it into a fresh Cask well-scented, together with the whole Remainder of the *Wine* in the Hogshead, and so leave it to fine.

To help stinking *Wines*, the general Remedy is racking them from their old and corrupt Lee: Besides which, some give them a fragrant Smell or Flavour, by hanging in them little Bags of Spices, such as Ginger, Zedoary, Cloves, Cinnamon, Orras Roots, Cubebs, Grains of Paradise, Spikenard, and other Aromatics.

Others boil some of these Spices in a Pottle

of good sound *Wine* of the same Sort, and run up the Decoction hot.

Others correct the ill Savour of rank-lee'd *French Wine* with only a few Cinnamon Canes hung in them.

Others again, for the same Purpose, use Elder Flowers and Tops of Lavender.

Having thus run over the *Vintner's Dispensatory*, and describ'd many of their principal Receipts or Secrets, for the Cure of the acute Diseases of *Wine*, we shall come to the fourth Head, which contains Medicaments proper for their chronic Distempers, viz. *Loss of Spirits*, and *Decay of Strength*.

Concerning these, therefore, it is observable, that as when *Wines* are in praternatural Commotions, from an Excess and Predomination of their sulphureous Parts, the Grand Medicine is to rack them from their Lees; so on the contrary, when they decline, and tend towards palling, by Reason of the Scarcity of their Spirits and Sulphur; the most effectual Preservative is to rack them upon other Lees, richer and stronger than their own; that being from thence supply'd with the new Spirits, they may acquire somewhat more of Vigour and Quickness.

I say Preservative, because there is, in truth, no restoring of *Wines* after they are perfectly pall'd and dead; for nothing that is past Perfection, and hath run its natural Race once, can receive much Amendment.

But besides reinforcing of impoverish'd *Wines*, by new and more generous Lees, there are sundry Confections, by which also, as by Cordials, the languishing Spirits of many of them may be sustained, and to some Degree recruited; of which the following are Examples.

When *Sacks* begin to languish (which doth not often happen, especially in this City, where it is drank in plenty) they refresh them with a cordial Syrup, made of most generous *Wine*, Sugar and Spices.

For *Rhenish* and *White-wines*, a simple Decoction of Raisins of the Sun, and a strong-scented Cask, usually serve the Turn.

For *Claret* inclining to a Consumption, they prescribe a new and richer Lee, and the Shavings of Firwood; that the Spirit being recruited by the additional Lee, may be kept from exhaling by the unctuous Spirit of the Turpentine.

This Artifice is us'd in *Paris* in the most delicate and thin-bodied *Wines* of *France*, and is very probably the Cause of that exceeding Dullness and Pain of the Head, which always attends Debauches with such *Wines*.

Nor is it a modern Invention, but well known to, and frequently us'd by the *Romans*, in the Time of their greatest Wealth and Luxury: For *Pliny* (*Hist. Nat. lib. 14. cap. 2.*) takes singular Notice of the Custom of the *Italian Vintners*, in mixing with their *Wines* Turpentine of several Sorts.

The *Grecians* long before had their *Vina Picata* and *Resmata*, as is evident by the Commendation of such *Wines* by *Plutarch*, and

and the Prescription of them to Women, in some Cases, by *Hippocrates*; and they were so much delighted with their *Vinum Piscites*, that they consecrated the Pitch-tree to *Bacchus*. But I shall next take some Notice of the more disingenuous Practices of Vintners in the Transmutation or Sophistication of *Wines*, which they call *Trickings* or *Compassings*.

They transform poor *Rochel* and *Cogniac* *White-wines* into *Rhenish*; *Rhenish* into *Sack*; the Laggs of *Sack* and *Malmseys* into *Muscadels*.

They counterfeit *Raspie Wine* with Flower-de-Luce Roots; *Verdea* with Decoctions of Raisins: They sell decayed *Xeres*, vulgarly *Sherry*, for *Lusenna Wine*: In all these Impostures deluding the Palate so neatly, that few are able to discern the Fraud; and keeping these *Arcana* so close, that few can come to the Knowledge of them.

As for their Metamorphosis of *White* into *Claret*, by dashing it with *Red*, nothing is more commonly either done or known.

For their Conversion of *White* into *Rhenish*, they have several Artifices to effect it, among which this is the most usual.

They take a Hogshead of *Rochel*, or *Cogniac*, or *Nantz White wine*, rack it into a fresh Cask strongly-scented; then give the *White* Parel: Put into it eight or ten Gallons of clarify'd Honey, or forty Pounds of coarse Sugar, and beating it well, leave it to clarify.

To give this Mixture the delicate Flavour, they sometimes add a Decoction of Clary-Seeds, or of *Gaktricum*; of which Drugs there is an incredible Quantity used yearly at *Dort*, where the Staple of *Rhenish Wines* was; and this is that Drink with which the *English* Ladies were wont to be so delighted, under the specious Name of *Rhenish in the Must*.

The Manner of Making *Adulterate Bastard* is thus:

Take four Gallons of *White-wine*, three Gallons of old *Canary*, five Pounds of *Bastard* Syrup, beat them well together, put them into a clean Rundlet well scented, and give them Time to fine.

Sack is made of *Rhenish*, either by strong Decoctions of *Malaga* Raisins, or by a Syrup of *Sack*, Sugar, and Spices.

Muscadel is sophisticated with the Laggs of *Sack* or *Malmsey*, thus;

They dissolve it in a convenient Quantity of Rose-water, of Musk two Ounces, of *Calamus Aromaticus* powder'd, one Ounce, of *Coriander* beaten, half an Ounce; and while this Infusion is yet warm, they put it into a Rundlet of old *Sack*, or *Malmsey*; and this they call a *Flavour* for *Muscadel*.

There are many other Ways of adulterating *Wines* in this City, but because they all tend to the above-mention'd Alterations, and are not so general, I shall pass them over, and mention the Observations of a certain curious Author on this Subject.

The Mystery of *Wines* consists in the making and meliorating of Natural *Wines*.

Melioration is either of sound or vicious *Wines*. Sound *Wines* are better'd,

1. By Preserving.
2. By timely Fining.
3. By mending Colour, Smell, or Taste.

1. To preserve *Wines*, Care must be taken, that after the Pressing they may ferment well; for without good Fermentation they become *qually*, i. e. cloudy, thick, and dusky, and will never fine of themselves, as other *Wines* do; and when they are fined by Art, they must be speedily spent, or else they will become *qually* again, and then will not be recoverable by any Art.

The principal Impediments of the Fermentation of *Wines*, after pressing the Grapes, are either their Unripeness, when gather'd, or the Mixture of Rain-water with them, as in wet Vintages, or else through the Addition of Water to rich Grapes. The *Spaniards* use *Giesse* to help the Fermentation of their *Canary Wines*.

To preserve *Spanish Wines*, and chiefly *Canary*, and thereof principally that which is *razie*, which will not keep so long, they make a Layer of Grapes and *Giesse*, whereby it acquires a better Durance and Taste, and a whiter Colour, most pleasing to the *English*.

Razie Wine, is so called, because it comes from *Rhenish* Vine Cuttings, sometimes renew'd. The Grapes of this Vine are fleshy, yielding but a little Juice.

The *French* and *Rhenish Wines* are chiefly and commonly preserv'd by the *Match*, thus us'd at *Dort* in *Holland*:

They take twenty or thirty Pounds of Brimstone, rack into it melted, as Cloves, Cinnamon, Mace, Ginger, and Coriander Seeds; and some, to save Charges, use the Reliques of the Hippocras-bag; and having mixed these well with the Brimstone, they draw through this Mixture, long, square, narrow Pieces of Canvas, which Pieces thus drawn through the said Mixture, they light and put into the Vessel at the Bung-hole, and presently stop it close: Great Care is to be had in proportioning the Brimstone to the Quantity and Quality of the *Wine*; for too much makes it rough; this Smoaking keeps the *Wine* long, white, and good, and gives it a pleasant Taste.

There is another Way for *French* and *Rhenish Wines*, viz. Firing it: 'Tis done in a Stove, or else a good Fire made round about the Vessel, which will gape wide, yet the *Wine* runs not out; 'twill boil, and afterwards may soon be rack'd.

Secondly, for timely Fining of *Wines*. All *Wines* in the *Must* are more opacous and cloudy. Good *Wine* soon fines, and the gross Lees settle quickly; and also the flying Lee in Time. When the grosser Lees are settled, they draw off the *Wine*; this is called *Racking*. The usual Times for Racking are *Midsummer* and *Alballontide*.

The Practice of the *Dutch* and *English* to rid the *Wine* of the flying Lees speedily, and serves most for *French* and *Spanish Wine*, is thus perform'd:

Take

Take of Iſinglaſs half a Pound, ſteep it in half a Pint of the hardeſt *French Wine* that can be got, ſo that the *Wine* may fully cover it; let them ſtand twenty-four Hours, then pull and beat the Iſinglaſs to Pieces, and add more *Wines*; four times a Day ſqueeze it to Jelly, and as it thickens, add more *Wine*. When it is full and perfectly jellied, take a Pint or Quart to a Hogſhead, and ſo proportionably: Then over-draw three or four Gallons of that *Wine* you intend to fine, which mix well with the ſaid Quantity of Jelly, then put this Mixture to the Piece of *Wine*, and beat it with a Staff, and fill it top-full.

Note, That *French Wines* muſt be bung'd up very cloſe, but not the *Spaniſh*; and that Iſinglaſs raiſes the Lees to the Top of ſtrong *Wines*, but in weaker, precipitates them to the Bottom.

They mend the Colour of ſound *Clarets* by adding thereto *Red-wine*, *Tent*, or *Alicant*, or by an Infuſion of *Turnſole*, made in two or three Gallons of *Wine*, and then putting it into the Veſſel, to be then (being well ſtopp'd) rolled for a Quarter of an Hour.

This Infuſion is ſometimes twice or three times repeated, according as more Colour is to be added to the *Wine*; about three Hours Infuſion of the *Turnſole* is ſufficient, but then it muſt be rubb'd and wring'd.

Claret over red is amended with the Addition of *White-wines*.

White-wines coming over ſound, but brown, are thus remedied:

Take of Alabaſter Powder, over-draw the Hogſhead three or four Gallons, then put this Powder into the Bung, and ſtir and beat it with a Staff, and fill it top-full. The more the *Wine* is ſtirred, the finer it will come upon the Lee, that is, the finer it will be.

To colour *Sack* white; take of white Starch two Pounds, of Milk two Gallons, boil them together two Hours; when cold beat them well with a Handful of white Salt, and then put them into a clean, but ſweet Butt, beating them with a Staff, and the *Wine* will be pure and white.

One Pound of the before-mention'd Jelly of Iſinglaſs takes away the Brownneſs of *French* and *Spaniſh Wines*, mixed with two or three Gallons of *Wine*; according as it is brown and ſtrong, more or leſs to be uſed. Then over-draw the Piece of *Wine* about eight Gallons, and uſe the Rod; then fill the Veſſel full, and in a Day or two it will fine and be white, and mend, if *qually*.

The firſt Buds of *Ribes nigra*, i. e. *Black Currants*, infuſed in *Wines*, eſpecially *Rheniſh*, makes it diuretick, and more fragrant in Smell and Taſte, and ſo doth *Clary*.

The Inconvenience is, that the *Wine* becomes more heady; a Remedy for which is Elder Flowers added to the *Clary*, which alſo betters the Fragrancy thereof, as 'tis manifeſt in Elder Vinegar. But theſe Flowers are apt to make the *Wine* ropy.

To help brown *Malaga's* and *Spaniſh Wines*, take Powder of Orras Roots and Salt-petre, of each four Ounces, the Whites of eight

Eggs, to which add as much Salt as will make a Brine; put this Mixture into *Wine*, and mix them with a Staff.

To meliorate muddy and tawny *Clarets*; take of Rain-Water two Pints, the Yolks of eight Eggs, Salt, an Handful, beat them well, let them ſtand 6 Hours before you put them into the Cask, then uſe the Rod, and in three Days it will come to itſelf.

To amend the Taſte and Smell of *Malaga Wine*; Take of the beſt Almonds four Pounds, make an Emulſion of them with a ſufficient Quantity of the *Wine* to be cured; then take the Whites and Yolks of twelve Eggs, beat them together with an Handful of Salt, put them into the Pipe, uſing the Rod.

To amend the Smell and Taſte of *French* and *Rheniſh Wines* which are foul; take one Pound of Honey, an Handful of Elder Flowers, an Ounce of Orras Powder, one Nutmeg, a few Cloves to an Auln of the *Wine*, boil them in a ſufficient Quantity of the *Wine* to be cured, to the Conſumption of half, and when it is cold, ſtrain it, and uſe it with the Rod: Some add a little Salt. If the *Wine* be ſweet enough, add one Pound of the Spirits of *Wine* to a Hogſhead, and give the Cask a ſtrong Scent. Spirit of *Wine* makes any *Wine* brisk, and fines it, without the former Mixture.

A Lee of the Aſhes of Vine Branches, viz. a Quart to a Pipe, being beaten into *Wine*, cures the Ropineſs of it, and ſo infallibly doth a Lee of Oaken Aſhes.

For *Spaniſh ropy Wine*, rack it from the Lees into a new-ſcented Cask, then take of Allum one Pound, of Orras Roots powder'd half a Pound, beat them well into the *Wine* with a Staff: Some add fine and well dry'd Sand, put warm to the *Wine*. If the *Wine* beſides prove brown, add three Pottles of Milk to a Pipe; *alias*, the *Spaen* cures ropy *Wine*, before it begins to fret.

Herrings Roes preſerve any Stum *Wines*.

To other *Rheniſh Wines* when fretting. It is commonly in *June*, that *Wine* begins to ferment and grow ſick, then have a ſpecial Care not to diſturb it, either by removing, filling the Veſſel, or giving it Vent; only open the Bung, which cover with a Slate, and as often as the Slate is foul, cleanſe it and the Bung from their Filth; and when the Fermentation is paſt, which you ſhall know by applying your Ear to the Veſſel, then give it Reſt ten or twelve Days, that the groſſer Lees may ſettle, then rack it into a freſh-ſcented Cask.

This Mixture meliorates vitious *Wines* both in Smell and Taſte; eſpecially *French*: Take of the beſt Honey one Part, of Rain-Water two Parts, and one Third of ſound old *Wine* of the ſame Kind; boil them on a gentle Fire to a third Part, ſcumming them often with a clean Scummer (for which Purpoſe they have a Pail of fair Water ſtanding by to rince it in), then put this Mixture hot into a Veſſel of fit Capacity, and let it ſtand unbung'd 'till cool: Some, to better this, put in a Bag of Spices. This Mixture is, by the *Dutch*, called *Soet*, and will ſerve alſo to fine any *Wine*, new or old.

2. 'Twill mend the hard Taste of *Wine*, i. e. putting a Gallon thereof to a Hoghead, and using the Rod, and then let it rest five or six Days at the least; but if mild enough, add white Mustard-Seed bruised.

To mend and preserve the Colour of *Clarets*: Take red Beet-Roots *q. f.* scrape them clean, and cut them into small Pieces; then boil them in *q. f.* of the same *Wine*, to the Consumption of the third Part; scum it well, and when cool, decant off what's clear, and use the Rod.

Alias; Take of *Wine* and *Honey* of each two Pounds, *Rain-water* a Pottle, twelve Beet Roots, ripe Mulberries four or five Handfuls, boil them to half, and when cool, decant, &c. as above.

To preserve *Claret* rack'd from the Lees: Take to a Tierce ten Eggs, make a small Hole in the Top of the Shells, then put them into the *Wine*, and all will be consumed.

To prevent *Souring* of *French Wines*: Take Grains of Paradise *q. f.* beat them in a Pan, and hang them or put them loose in a Vessel. Some use Lavender Tops.

To help *Sour French Wine*: Take of the best Wheat four Ounces, and having been boiled in fair Water till it break, when cold, put it into a Vat in a Bag, and use the Rod.

Alias; Take five or six Cinnamon Canes, bung them up well.

To help *Spanish Sour Wines*: First rack the *Wine* into a clean Cask, and fill it up with two or three Gallons of Water, and add to it four Ounces of burnt Chalk, then rack it off after three or four Days, and fill it up again with *Rain-water*, if the first time doth not do it.

Some use Loom or Plastering; if these Ingredients make the *Wine* bitter, correct the Fault with Nutmegs and Cloves.

To help *Stinking Wines*: Take Ginger half an Ounce, Zedoary two Drams, powder them, and boil them in a Pottle of good *Wine*, which put scalding hot into the Vat; bung it up, and let it lie: The Species of *Diambra* and *Diamoscu Dulc.* do the same; and so Nutmegs and Cloves, which also give a kind of *Racinefs*.

To help *Wine* that hath an ill Savour from the Lees: First rack it into a clean Cask, and if *Red* or *Claret*, give it a fresh Lee of the same Kind; then take of Cloves, Cinnamon, Ginger two Ounces, Orras Root four Ounces; powder them grossly, hang them in a Bag, and taste the *Wine* once in three Days, and when 'tis amended, take out the Bag.

Some do it thus: Take of Cloves half a Pound, Mastick, Ginger, Cubebs, of each two Ounces, Spica Nardi three Drams, Orras Root half a Pound; make thereof a fine Powder, which put loose into the Vat, and use the Rod, and make a good Fire before it.

Firing of *Wines* in Germany is thus performed; They have in some Vaults three or four Stoves, which they heat very hot; others make Fires almost before every Vat; by this means the Must fermenteth with that Vehemency, that the *Wine* appears between the

Staves; when this Ebullition, Fermentation, and Working ceaseth, they let the *Wine* stand some Days, and then rack it. This Firing is only us'd in cold Years, when the *Wine* falls out Green.

Stum is nothing else but pure *Wine* kept from fretting by often racking, and matching it in clean Vessels, and strongly scented, i. e. new matched, by means whereof it becomes as clear, or clearer, than any other *Wine*, preserving itself from both its Lees by Precipitation of them; but if through Neglect it once fret, it becomes good *Wine*.

The Bung of the Vessel must be continually stopp'd, and the Vessels strong, lest they break. A little *Stum* put to *Wine* decay'd, makes it ferment afresh, and gives Life and Sweetness to it; but offends the Head and Stomach, torments the Guts, and is apt to cause Loosenesses, and some say Barrenness in Women.

To fine *Wine* presently: Fill a Cask with Shavings or Chips of Beech or Oak; (which are best) this is to be done with much Art, or else it seldom hits right, but lasteth long: Put these Chips into a Cask, which is called by the *Dutch*, *Een Spaen*, i. e. a Chip, into which they pour in as much *Wine* as the Cask will hold, and in Twenty-four Hours the *Wine* will be fine. Or a Quart of Vinegar in three Days will fine a Hoghead of *Wine*.

To set old *Wine* a fretting, being deadish and dull of Taste: Take of *Stum* two Gallons to a Hoghead, put it hot upon the *Wine*, then set a Pan of Fire before the Hoghead, which will then ferment till all the Sweetness of the *Stum* is communicated to the *Wine*, which thereby becomes brisk and pleasant.

Some use this *Stumming* at any Time; some in August only, when the *Wine* hath a Disposition to fret of itself, more or less *Stum* to be added, as the *Wine* requires.

The best Time to Rack *Wine* is in the Decrease of the Moon, and when the *Wine* is free from fretting; the Wind being at North-East or North-West, and not at South, the Sky serene, free from Thunder and Lightning.

Another Match for *French Clarets* and *Spanish Wines*: Take Orras Roots, Mastick and Brimstone of each four Ounces, Cloves two Ounces; ordering it as above in Matching *Wines*; this will serve for all *Wines*, adding, if you please, Nutmegs, Ginger, Cinnamon, and other Spices; double the Quantity of Orras Root is to be used for *Spanish Wines*.

To help *Malaga's* which will not fine: Take of crude Tartar powdered, sifted and dried, two Pounds, mix it with the Whites of six Eggs; dry, powder and sift them again, then overdraw the Pipe as much as will serve to mix with this Powder, and fill the Pipe therewith, beating it with a Staff as before, and this *Wine* will be fine in ten Days.

Another speedy Way to fine *French Wines*: Hang a Piece of Scent in the Cask, and when 'tis burnt out, put in a Pint of the best Spirit of *Wine*, and stir it about. Some add a little Salt well dry'd; this fines the *Wine* in Twenty-four Hours.

To keep *Must* a Year: Take *Must*, put it into a Cask pitch'd within and without, half full, stop the Bung-hole close with Mortar.

Others sew the Cask in Skins, and sink it for thirty Days into a Well or River; or else a Garland of *Polium Montanum* hung in a Vessel; or rub the Inside of the Vessel with Cheese: All these preserve *Rhenish Must*.

Alum put into a Hog's Bladder, keeps *Wine* from turning flat, faint, or brown; and beaten with the Whites of Eggs, removes its Ropiness.

Flat Wines are recover'd with Spirit of *Wine*, Raisins and Sugar or Melasses; and Sacks, by drawing them on fresh Lees.

Our *Wine-Coopers* of later Times use vast Quantities of Sugar and Melasses, to make them drink brisk and sparkling, and to give them Spirits; and also to mend their bad Tastes; all which Raisins, and Cuts, and Stum perform.

Country Vintners feed their fretting *Wines* with raw Beef; and in Town, their Canaries with *Malaga*, which is added more or less to all Canaries.

The Composition of *Wines* is manifold, the Vintners usually drawing out of two or three Casks for one Pint, to accommodate it to the Palate of those that drink it. Most of the Canary is made with *Xerez Sack*.

As for compounded *Wines*, as *Muscadine* and *Hippocras*; the former is usually made with thirty Gallons of *Cute*, which is *Wine* boil'd to the Consumption of half, or the Lees and Droppings boil'd and clarified; its Flavour is made of Coriander Seeds prepared, and Shavings of Cypress Wood.

Some instead of *Cute*, make it of *Sugar Melasses* and *Honey*, or mix them with the *Cute*.

Hippocras may be made as follows;

Take of Cardamoms, Carpobalsamum, of each half an Ounce; Coriander Seeds prepared, Nutmegs, Ginger, of each two Ounces; Cloves two Drams; bruise and infuse them Forty-eight Hours in *Xerez* and *White-wine*, of each a Gallon, often stirring them; then add thereto of Milk three Pints, strain it thro' an *Hippocras* Bag, and sweeten it with a Pound of Sugar-Candy.

A certain Modern gives the following Directions for the ordering and improving of *Wines*.

When your *Wines* are press'd, put them into Casks that have been well cleansed and rinsed two or three Days before with Water, in which the Leaves or Flowers of Peaches have been infused, which gives them an agreeable Flavour.

N.B. Put *White-wines* in new Casks, lest old ones change their Colour.

If your Grapes are not ripe enough, or of the last gathering, or of a small Body, about three Weeks after they are put up in Casks, roll them five or six times a Day for four or five Days following; then two or three times a Day for three or four Days following; once a Day for ten Days after that; thence once in three or four Days (and if your Grapes were

gathered very green) continue rolling them in the whole about five or six Weeks.

N.B. This Rolling is to be performed discretionally, in proportion to the Ripeness or Greenness of the Grapes when gathered, viz. If Ripe, very little Rolling will serve, once in four or five Days for a Month is sufficient.

This Rolling heightens the Fermentation, heats the *Wine*, causing it to purge and purify, and helps to ripen it better than any Method yet known. Besides, this mixing it with the Lee, sweetens and strengthens it, and renders it more palatable.

When your *Wines* ferment, (which they'll do in a few Days) take out the Bung of each Cask, covering it with a Cloth laid hollow over the Hole, to prevent Dirt from falling therein.

Take off the Froth, which works like Yeast, and put a little into those Casks which are backward in fermenting, and it will greatly help their Fermentation.

It is to be observed, that the finest *Wines* ferment the soonest, the rest in proportion to their Goodness. The Fermentation will continue about ten or twelve Days at least.

When the Fermentation is over, (which you'll know by the Froth ceasing) fill up each Cask within two Inches, and bung it up close, opening at the same time a small Vent-hole, to carry off what may be thrown up by the Fermentation's not being quite ceased.

Continue filling up, as before, for ten or twelve Days, till you are sure the *Wine* has done Fermentation, lest the Foulness, which should work through the Vent-hole, sink down for want of Passage, and foul the *Wine*.

After these twelve Days are expired, fill the Cask within one Inch, once in six Days for a Month; after which, once in fifteen Days for three Months. For tho' the Fermentation will be quite over long before this Time, yet the Casks must be fill'd once a Month, as long as they are kept in the Cellar or Warehouse, because all *Wines* will waste in the Cask, and if they are not kept continually filled up, they will grow flat and heavy.

Stop up the Vent-hole as soon as you are sure the *Wines* have done working, and open them when you perceive them to work at any Time. Observation and Discretion will best guide on these Occasions.

In *Champaign* and *Burgundy*, such as are curious in their *Wines*, keep Warehouses as well as Cellars, for the Advantage of keeping their *Wines* cool, into which they move them alternately twice a Year, viz. from *April* to *November* they keep them in their Cellars, and from *November* to *April* in Warehouses above Ground; such Warehouses being found, by Experience, to be cooler in *Winter* than Cellars, being more expos'd to the Rigour of the Season; whereas Cellars are coolest in *Summer*, being less expos'd to the Warmth of the Sun and Air.

'Tis a known Rule, that the cooler *Wines* are kept, the longer they will last good, and be more grateful to the Palate, and 'tis best to keep

keep them, as near as possible, in an equal Degree of Heat.

Wines kept too warm are apt to turn sour.

About the Middle of *December*, if your *Wines* are settled after working, draw them off from the Lees for the first Time into fresh Casks, cleansed and prepared as before directed; observing (as before) to keep them fill'd up, and continue undisturbed till the Middle of *February*, at which Time draw them off again as before.

Do the like at the latter End of *March*, and again in *April*, before they are laid into the Cellars for to keep them cool as before directed.

Drawing off *Wines* frequently from the Lees, renders them brisk, lively, and sparkling in the Glafs; while the contrary produces a muddy Dreg or Sediment, makes them thick or dull, and sometimes ropy.

To remedy which, when they draw off the *Wines* first, take an Ounce of fine Isinglass to each Fifty Gallons of *Wine*: Beat it well with a Hammer; infuse it in about a Quart of *Brandy* or *White-wine*, till it is fully dissolved, which will be done soonest over a gentle Fire, strain it through a Sieve till it is clear from any Foulness, then pour it into the Bung-hole, stirring it well with a Stick; but so as to move the Lees or Bottom as little as possible. This Stirring puts the *Wine* into a Ferment, and the glutinous Parts of the Isinglass seizes all the Foulness, and makes it sink to the Bottom, and become fine in about seven Days.

When you Bottle off *Wines*, observe to do it in *Winter* on a frosty or dry Day; and in *Summer*, on a cool Day. Hot, misty or rainy Weather being detrimental to them.

When your Bottles are filled and well corked, strew the Floor of the Cellar or Warehouse with Sand or Saw Dust about three Inches thick, laying your Bottle slope-wise thereon, and not setting them upright, which lets in Air. It will not be amiss to tie down the Corks, and to dip them and the Mouth of the Bottles into the Rosin and Pitch warmed, which will prevent the Air getting in, or the *Wine* leaking out.

If the *Wine* in your Bottles should prove ropy on Occasion of the Grapes being too ripe, or any other Cause, move them out of the Cellars into the open Air, (into a Garret, if you have one) 'twill recover them quickly.

In *Champaign* they have an Invention of a Leather Pipe, which they affix to the Bung-hole of the full and empty Hogshead; and by which means, and a Pair of Bellows contriv'd for the Purpose, they shift their *Wines* without disturbing them; but our common Way of the Crane being as good, it may serve as well, tho' that is particularly describ'd in the Chapter treating of *Wine-Press* in Letter W, and also the Form of them is there delineated on a Copper Plate.

These Rules and Instructions, if well observed, will be sufficient for the Management of *Wines* from the Gathering the Grapes, Pressing them, Casking, Fineing, and Preserving the *Wine*, till it is drawn.

Red-wines prick'd or sour may be changed to *White-wines*, and become drinkable by the following Method practis'd by the *London* Vintners.

When *Red-wines* are prick'd or eager, take three or four Gallons of new *Milk*, let it stand till it creams, skim it clean, and set it again to cream, and repeat the Skimming till no more Cream will arise, and the *Milk* appear blueish; then take the Whites of about eighteen or twenty Eggs, beat them well, and mix them well with the *Milk*; then pour it into your Cask of eager *Red-wine*, and with a Stick which reaches almost to the Bottom, stir it about as quick as you can for six or seven Minutes; then stop the Cask up close, and the Red Colour will all sink to the Lees, and a clear *White-wine* will remain; which, if too weak or faint, may be helped and reviv'd with *Aqua Vita*, Spirits of *Wine*, or other strong Mixture, till 'tis of a Strength suitable to your Purpose, which must be guided by your Discretion and Judgment; let it stand some Time to settle before you draw it.

This is a common Practice at this Day, though known to few, but profess'd Vintners and *Wine-Coopers*.

Having thus given an Account of the different Practices of the *Vignerons*, *Vintners*, and *Wine-Coopers*, in the Management of their several *Wines*, I shall next offer a few things which have occurred to me from some Observations and Experiments relating to the making of *Wines* in *England*.

The Grapes being ripe, should be cut when they are perfectly dry, and carried into a large, dry Room, where they must be spread upon Wheat Straw, in such a manner as not to lie upon each other; in this Place they may remain a Fortnight, three Weeks or a Month, according as there is Conveniency, observing to let them have Air every Day, that the Moisture perspired from the Grapes may be carried off. Then, having the Presses and other things in Order, you should proceed in the following manner: First, all the Grapes should be pulled off the Bunches and put into Tubs, being careful to throw away such as are mouldy, rotten or not ripe, which, if mix'd with the others, will spoil the *Wine*; and if the Stalks of the Bunches are press'd with the Grapes, there will be an austere Juice come from them, which will render the *Wine* acid and sharp; This, I fear, has spoil'd a great Quantity of *Wine* which was made in *England*, which, if otherwise managed, might have proved very good. For we find in *France*, and other *Wine* Countries, where Persons are desirous of having good *Wine*, they always pick the Grapes from off the Stalks before they are press'd; tho' indeed the common *Vignerons*, who have more regard to the Quantity than the Quality of their *Wines*, do not practise this. But as in *England* we labour under the Inclemency of Climate, so we should omit nothing of Art which may be necessary to help the Want of Sun.

The Grapes, being thus carefully pick'd off, should be well press'd; and if it is design'd for
Red

Red Wine, the Husks and Stones should be put into the Liquor, (which must be put into a large Vat) where the whole should ferment together five or six Days; after which the *Wine* should be drawn off and put into large Casks, leaving the Bung-hole open to give Vent to the Air which is generated by the Fermentation. But it must be remark'd, that after the *Wine* is pressed out and put into the Vat with the Husks, if it does not ferment in a Day or two at most, it will be proper to add a little Warmth to the Room by Fires, which will soon put it into Motion; and for Want of this it often happens, where People press their *Wine*, and leave it to ferment in open cold Places, that the Nights being cold, checks the Fermentation, and so causes the *Wine* to be foul, and almost ever after upon the Fret. This Husbandry is much practis'd upon the *Rhine*, where they always have Stoves placed in the Houses where the *Wine* is fermented, wherein they keep Fires every Night if the Season is cold, while the *Wines* are fermenting.

If *White-wine* is desir'd, then the Husks of the Grapes should not remain in the Liquor above twelve Hours, which will be long enough to set it a fermenting. And when it is drawn off and put into other Vessels, it should not remain there above two Days before it is drawn off again, and this must be repeated three or four times, which will prevent its taking any Tincture from the Husks in fermenting.

When the greatest Fermentation is over, the *Wine* should be drawn off into fresh Casks, which must be filled within a very little of the Top, but the Bung-hole should be left open three Weeks or a Month, to give Vent to the generated Air; and as the *Wine* subsides in the Casks, so they should be carefully refilled with *Wine* of the same sort from a Store Cask, which should be provided for that purpose; but this must be done with much Care, lest by hastily refilling the Casks, the Scum which is naturally produced upon all New *Wines* should be broken thereby, which will mix with the *Wine* and foul it, causing it to take an ill Taste; therefore it would be proper to have a Funnel, which should have a Plate at the small End, bored full of little Holes, that the *Wine* may pass thro' in small Drops, which will prevent its breaking of the Scum.

After the *Wine* has remain'd in this State a Month or six Weeks, it will be necessary to stop up the Bung-hole, lest, by exposing it too much to the Air, the *Wine* should grow flat, and lose much of its Spirit and Strength; but it must not be quite stopp'd up, but rather should have a Pewter or Tin Tube, of about half an Inch Bore, and two Feet long, placed in the Middle of the Bung-hole. The Use of this Tube is to let the Air, which is generated by the Fermentation of the *Wine*, pass off, because this being of a rancid Nature would spoil the *Wine*, if it were pent up in the Cask; and in this Tube there may always remain some *Wine*, to keep the Cask full, as the *Wine* shall subside; and, as it shall be necessary, the *Wine*

in the Tube may be easily replenish'd. For want of rightly understanding this Affair, a great Quantity of the choicest *Wines* of *Italy*, and other Countries, have been lost: A great Complaint of this Misfortune I received from a very curious Gentleman in *Italy*, who says; "Such is the Nature of this Country *Wines* in general, (nor are the choicest *Cbianti's* excepted) that at two Seasons of the Year, viz. the beginning of *June* and *September*; the first when the Grapes are in Flower, and the other when they begin to ripen; some of the best *Wines* are apt to change, (especially at the latter Season); not that they turn eager, but take a most unpleasant Taste, like that of a rotten Vine Leaf, which renders them not only unfit for Drinking, but also to make Vinegar of; and is called the *Settembrine*. And what is most strange, is, that one Cask, drawn out of the same Vat, shall be infected, and another remain perfectly good, and yet both have been kept in the same Cellar.

"As this Change happens not to *Wines* in Flasks (though that will turn eager) I am apt to attribute it to some Fault in refilling the Cask, which must always be kept full; which either by letting alone too long, till the Decrease be too great, and the Scum there naturally is on all *Wines*, thereby being too much dilated, is subject to break, or else, being broken by refilling the Cask, gives it that vile Taste. But against this there is a very strong Objection, i. e. that this Defect seizes the *Wine* only at a particular Season, viz. *September*, over which if it gets, it will keep good many Years. So the Case is worthy the Enquiry of Naturalists, since it is evident that most *Wines* are more or less affected with this Distemper, during the first Year after making.

Upon receiving this Information from *Italy*, I consulted the Reverend Mr. *Hales* of *Teddington*, who was then making many Experiments on fermenting Liquors, and received from him the following curious Solution of the Cause of this Change in *Wine*, which I sent over to my Friend in *Italy*, who has tried the Experiment, and it has accordingly answered his Expectation, in preserving the *Wine*, which was thus managed, perfectly good: He has also communicated the Experiment to several Vignerons in different Parts of *Italy*, who are repeating the same: Which take in Mr. *Hales's* Words.

"From many Experiments which I made the last *Summer*, I find that all fermented Liquors do generate Air in large Quantities, during the Time of their Fermentation; for, from an Experiment made on twelve Cubick Inches of *Malaga Raisins*, put into eighteen Cubick Inches of Water the beginning of *March*, there were 411 Cubick Inches of Air generated by the Middle of *April*; but afterwards, when the Fermentation was over, it resorb'd a great Quantity of this Air. And from forty-two Cubick Inches of *Ale* from the *Tun* (which

“ (which had fermented Thirty four Hours before it was put into the Bolt-head) had generated 639 Cubick Inches of Air, from the Beginning of *March* to the Middle of *June*, after which it resorbed Thirty two Cubick Inches of Air: From whence it is plain that fermented Liquors do generate Air, during the Time of their Fermentation, but afterwards they are in an imbibing State; which may, perhaps, account for the Alteration of the nice *Italian Wines*; for *Wine*, during the first Year after making, continues fermenting more or less, during which Time a great Quantity of Air is generated, until the Cold in *September* put a Stop to it; after which it is in an imbibing State. Now the Air thus generated is of a rancid Nature (as the *Grotto del Cano*) and will kill a living Animal if put into it. So that if, during the Fermentation of the *Wine*, there are two Quarts of this rancid Air generated, which is closely pent up in the upper Part of the Vessel, when the Cold shall stop the Fermentation, the *Wine* by absorbing this Air, becomes foul, and acquires this rancid Taste; to prevent which I would propose the following Experiment.



“ Suppose the Vessel *A* filled with *Wine*, in the Bung-hole of this Vessel *b*, I would have a Glas Tube of two Feet long, and about two Inches Bore, fix'd with a Pewter Socket closely cemented, so as that there may be no Vacuities on the Sides, and into this Tube should be another of about half an Inch Bore, closely fixed; the lower Tube should always be kept about half full of *Wine*, up to *X*, which will supply the Vessel, as the *Wine* therein shall subside, so that there will be no Room left in the upper Part of the Vessel to contain generated Air, which will pass off thro' the upper small Tube, which must be always left open for this purpose; and the Tube being small, there will be no danger of letting in too much Air to the *Wine*.

“ As the *Wine* in the lower Tube shall subside, it may be refilled by introducing a slender Funnel thro' the small Tube, down to the Scum upon the Surface of the *Wine* in the larger Tube, so as to prevent its being broken, by the *Wine* falling too violently upon it. This Experiment being tried with Glas Tubes, will give an Opportunity to observe what Impression the different States of the Air has upon the *Wine*, by its rising or falling in the Tubes; and if it succeeds, it may be afterwards done by wooden or metal Tubes, which will not be in danger of breaking.

This curious Experiment having succeeded where-ever it has yet been tried, will be of great Service in the Management of *Wines*, there being many useful Hints to be taken from it, particularly with regard to fermenting *Wines*; for since we find that *Wines* too long fermented, (especially those which are

produced in cool Countries) do seldom keep well; so by letting them stand in a cool Place, the Fermentation will be check'd, which is agreeable to the Practice of the *Champagnoise*, who keep their *Wines* in *Winter*, in Cellars above Ground; but when the Weather grows warmer in *Spring*, they then carry them down into their Vaults, where they are cooler than in the Cellars; and this Method of removing their *Wines* from the Cellars to the Vaults, and back again into the Cellars, as the Seasons of the Year shall require, is found of great Service in preserving the *Wines* in Perfection. For these *Wines* being weak, (when compar'd with those produced in more Southern Countries) have not Body enough to maintain them, if they are permitted to ferment all the succeeding *Summer*, which the Heat of the Season will promote where the *Wine* is expos'd to its Influence; and this surely must be worth the Tryal by those who do make *Wine* in this Country, since it is the Practice of the *Northern* Countries, which is the most proper for our Imitation, and not that of the more *Southern*.

But after the *Wine* has pass'd its Fermentation in the Vat, and is drawn off into the Casks, it will require something to feed upon, so that you should always preserve a few Branches of the best Grapes, which may be hung up in a Room for that purpose, until there be Occasion for them, when they should be pick'd off the Stalks, and two or three good Handfuls put into each Cask, according to their several Sizes: For want of this many times People make use of other things, which are by no means so proper for this Purpose.

The Vignerons of different Countries do also put various Sorts of Herbs into the Vat, when the *Wine* is fermenting to give it different Flavours. Those of *Provence* make use of *Sweet Marjoram*, *Balm*, and other Sorts of Aromatick Herbs; and upon the *Rhine* they always put some Handfuls of a peculiar Kind of Clary into the Vats, from whence arises the different Flavours we observe in *Wines*, which, it's probable, were made in the same manner, and from the same Sort of Grapes. How far this might be thought worth practising in *England*, a few Experiments would inform us; though it is to be question'd, whether these Herbs do mend the *Wine*, because it seems to obtain amongst the Vignerons, purely to alter the Flavour of their *Wines*, in order to render them agreeable to the Palate of their particular Customers. But however this be, it is yet certain, that there is some Art used to alter the Flavour of the *Wine*, in most of the different *Wine* Countries of *France*, for it is the same Sort of Grape, which the Curious do always plant in *Orleans*, *Champaign*, *Burgundy* and *Bordeaux*; and how different these *Wines* are in their Flavour and Quality, every one who is acquainted with them, well knows; and this Difference can never be effected by the Situation of the Places, since there is no very great Difference in the Heat of those Countries; nor do I believe their different Ways of making the *Wine* can alter their Flavour so much,

much, especially those of *Orleans*, *Burgundy*, and *Bordeaux*, where there is little Difference in their Management; but in *Champaign* there is this Difference from the rest, that they always cut their Grapes in a Morning before the Dew is gone off, or in cloudy Weather; whereas the *Vignerons* of all the other Places, do never cut any until they are perfectly dry, which may occasion a great Alteration in the *Wine*.

The Method commonly practis'd to give the red Colour to *Wine*, is to let it ferment a few Days upon the Skins, which they always observe to press two or three times, in order to make them discharge their Contents: But where a deep-colour'd, rough *Wine* is desired, there they put a Quantity of a certain Sort of Grape, whose Juice is red, into each Vat; this is well known in *England* by the Name of *Claret Grape*; the Leaves of this Vine do always change to a deep purple Colour as the Fruit ripens; and the Grapes are of a fine blue Colour, with a Flue over them like fine Plums; but the Juice of them is very austere, especially if they are not very ripe.

This *Red-wine* will not require to be drawn off into Casks more than at first from the Vat, for it may remain in the same Vessels until it is fit to Bottle off, which, I think, should not be done till the *Wine* is a Year old, for the greater Quantity of *Wine* there is in each Vessel, the more Force it will have, and so consequently be in less Danger of suffering from the Injuries of Weather, especially if the before-mention'd Method be practis'd. But where there are large Quantities of *Wine* preserved in close Vaults, People should be very cautious how they at first enter them, after they have been shut up for some Time, because the Air of this Vault will become rancid from the Mixture of the generated Air proceeding from the *Wines*, which has often kill'd People who have incautiously entered them.

Of the Concentration of Wines and other fermented Liquors, so as to reduce them in Bulk, render them more unalterable and perfect, more durable and fit for Service, Carriage and Exportation; by Doctor Stahl; translated by Doctor Shaw.

Dr. Stahl treats this Subject to the purpose following:

1. He observes that *Wines*, and all fermented Liquors, both before and after Fermentation, consist not of Similar Parts, but Heterogeneous ones, connected together in one certain determinate Order. Thus the Action and Essence of Fermentation, being a Separation and Destruction of the former Connexion of the Subject, and transposing its Parts anew; there must of necessity have been a Kind of firm and durable Texture in the Subject so disjointed, separated and new ranged.

2. For Example, Grapes being laid upon dry Straw in a cold Place, will, for some time after they are separated from the Vine, preserve that Texture which gives them their saline, unctuous and slimy Sweetness, which the Juice also retains after pressing, and be-

comes a clear transparent Must, without separating its self into the heterogeneous Parts; but continuing uniformly and evenly mixed; so as to preserve the different Matters it consists of, intimately collected among themselves. And in this firmly connected State it may be kept for many Months, if a Cask be perfectly filled therewith, and set in a cold Place, as is evidently seen in Stum.

3. *Wine*, in the precise chymical or philosophical Notion thereof, is a saline, clammy, oleaginous Matter, diluted with a large Proportion of Water; whereby it is set at a Distance from its self, or expanded; whilst the saline Parts are saturated with, and interspersed among the subtile earthy ones, that make the Sliminess; and then together they imbibe, detain, entangle and hold the grosser oily Parts: Besides which, there are other oily Parts, vastly more subtile, that by means of the highly attenuated saline Portion adhering to them, remain as much connected with the Water as the rest; and these are what we call the spirituous Parts; but the Connexion of them all together is so strong and durable, that they move for a long Time as one Body, without separating, if carefully preserved.

4. But if the spirituous Part be once drawn away, and separated from the *Wine* by Distillation, tho' it were immediately poured back, or restored to the remaining Mass from whence it came, and ever so finely shook in again therewith, the Whole by no means recovers its former Taste, Odour, and Durability, but turns to a confused, turbid Mixture of a different nauseous Taste, unnatural Smell, and approaches near to a Vapidity.

5. Again, if an inflammable Spirit, distill'd from the same, or any other Kind of *Wine*, be put to a Parcel of *Wine* that was too saline, or not sufficiently spirituous, the bare Addition or tumultuary Admixture thereof, very far from giving the fine and intimate Softness of a good *Wine*, will rather manifest its own burning Acrimony and inodorous Flavour, to the Smell and Taste; and also add a nauseous Bitterness to the former Tartness and Austerity.

6. So likewise any considerable Heat, or even a Degree of Simmering or Trepidity, will, by its intestine and subtile Agitation, that barely disturbs the exceeding fine spirituous Parts, which are very susceptible of the Motion of Heat, or disjoins them from the rest, occasion an Alteration of its Taste, Transparency and Durability, as much as if the Spirit had really been drawn off and poured back again.

7. On the other hand, *Wine* kept in a cool Vault, and well secured from the external Air, will preserve its Texture intire in all the constituent Parts, and sufficiently strong for numerous Years; as appears not only from old *Wines*, but other foreign fermented Liquors, particularly those of *China*, prepared from a Decoction of Rice, which being well closed down, and buried deep under Ground, continue for a long Series of Years Rich, Strong and Generous, as the Histories of that Country universally assure us.

8. The

8. The like is also to be understood of Vinegar, after it has thrown off the superabundant earthy Parts, and many of the oily ones that presided while it continued *Wine*; whence the saline ones now get the Ascendant, and, as it were, subdue and preside over the spirituous; for good and perfect Vinegar, being well stop'd down, will continue pure and unaltered for a great Length of Time.

9. But if it be left open, so that its fine Vapour exhales, or its more subtle Part be drawn off from it, and again pour'd back; in either Case it loses its uniform Consistence, and particularly its Durability, and now directly hurries into Vapidity and Corruption.

10. If either by Fraud or Accident, a larger Proportion of Water comes to be mix'd with *Wine*, than is absolutely proper for its Consistence, and no way necessary or essential; this superfluous Water does not only deprave the Taste, and spoil the Excellence of the *Wine*, but also renders it less durable; for Humidity in general, and much more a superfluous aqueous Humidity, is the primary and restless Instrument of all the Changes by Fermentation.

11. It may therefore, doubtless, be useful, and sometimes very convenient, to take away this superfluous Water from the other Part which strictly and properly constitutes the *Wine*: But for the Method that this may commodiously be done, he first examines those propos'd by others for that Purpose, and shews the Difficulties and Insufficiencies, and afterwards proposes an easy Way of effecting the Thing.

The Method of condensing Wines by Heat or Evaporation.

1. It will be found by any Person who shall make the Experiments, that all fermented Liquors labour with an over Proportion of Water; and that, if a very considerable Quantity of it were taken away, they would become not only more rich, but also more durable, provided so much Humidity were still retain'd as is just necessary to preserve the vinous Consistence, keep the saline Part fluid, and the slimy and the unctuous Parts mix'd in and expanded along with the rest.

2. But as an actual and truly saline Matter abounds in *Wine* and *Vinegar*, and that of an acid, austere or tartarous kind, when the spirituous Part is drawn away, the *Wine* becomes surprisingly more austere; and when a large Quantity of the watery Part is separated, this super-abundant saline, tartarous Matter coagulates into a Crystalline Form, and falls to the Bottom, or strikes to the Sides of the Cask; for the subtil oily Matter, which makes the spirituous Part in *Wine*, blunts, and takes off from a tartarous Acidity, in the same manner as the Addition of rectify'd Spirits of *Wine* blunts, sheaths and dulcifies the corrosive and acid Spirits of Nitre, Salt, and Vitriol.

3. But this tartarous Salt also abounding with an over Proportion of a gross, unctuous Mat-

ter, cannot be dissolv'd or diluted without a very large Proportion of Water; which being taken away, it presently concretes into dry, solid Crystals; as in the known Case of *Cremor Tartar*.

And hence proceeds the Effect before observ'd; viz. That the Acidity and Roughness of the *Wine* manifest themselves the more, when the *Wine* is depriv'd of its Spirit.

And this is an Experiment familiar in the Kitchen, when *Wine* is burnt or us'd in Sauce, for boiling always gives it a much greater Degree of Austerity.

4. And when this Water is, even by Distillation plentifully drawn off from *Wine*, not of a terrestrial and chalky, but of a tartarous Nature, a beautiful Tartar will be found to crystallize among the remaining Mass, and destroying those Properties thereof, which ought to be preserv'd.

5. For first, the spirituous Part is the Life of the *Wine*, and all fermented Liquors, and not only keeps them together, embalms the Whole, and renders it durable, or not subject to Corruption; but also, in great measure, gives them that aromatick, refreshing and restorative Virtue and Effect they have upon the human Body.

6. Nor is this all; but the intimate and extremely subtil Union of this spirituous Part with the rest, is perfectly the sole and intire Cause of both the former Effects: So that it by no means suffices to have the Spirit barely present among the other Parts, for then it might be drawn off, and return'd back again without Damage to the *Wine*; but the essential Union is here dissolv'd by taking it away, and can never be restor'd by a simple Reaffusion. 'Tis therefore destructive of the End propos'd, thus to break and dissolve the Texture of the *Wine*, as this intirely subverts and corrupts its Nature.

7. This inevitably proves the Case, whenever *Wine* is evaporated or distill'd, which constantly requires a Degree of Heat sufficient to convert Water into Vapour; whence the spirituous Part being much more volatile than the aqueous, flies off together with, or even before it, and thus leaves the *Wine* dissolv'd in its Texture, and without its Soul.

Upon which the remaining saline, slimy, unctuous Mass is so disturb'd, as no longer to remain connected, but immediately turns thick and turbid, and afterwards runs impetuously into a kind of Corruption, attended with Vapidity, and Ropiness.

All which Circumstances abundantly shew the Method of Exhalation to be absolutely unfit for condensing *Wines*, as it so many Ways destroys the whole vinous Texture and Compages.

Of the Method of condensing Wines by Percolation.

1. That *Wine*, strictly and properly so call'd, is of a grosser and thicker Body than Water; or that the essential and truly constituent Parts of *Wine* may be consider'd as separate

tate and distinct from a superfluous and copious Aquosity, appears both *à priori* and *à posteriori*.

2. For first, 'tis rational to conceive, that a Matter consisting of a Collection of saline, slimy and unctuous Parts, brought into one Mass, should have a grosser Consistence than pure and simple Water.

3. And next; this Grossness of the proper and essential Particles of *Wine* manifests itself to the Eye,

1. In those Diseases of *Wine*, wherein they become viscous and ropy, when they not only lose their Transparency, but may be drawn out and extended like a Mucus; and do not, upon pouring out, then fall in Drops, but run down in long ropy Strings.

2. It appears again to the Eye, in *Vinegar* grown mothery, mucilaginous and tough, so as sometimes to afford a dense Skin, like Leather; which cannot well be suppos'd to proceed from the Water, but from the more proper and essential Parts of the *Wine* it was made of.

3. But because these Inspissations may possibly be attributed to some supernatural Disorder of the *Wine*, we may add, That our *Method of Concentration* exhibits this Grossness of Parts to the Eye, whilst the *Wine* remains in a perfect State, free from its superfluous Aquosity; for here it appears much denser and deeper in Colour; less fluid, less thin, less transparent, and in every respect of a thicker and higher Consistence.

4. Lastly, this is still more evident in *Malt Liquors*, which being concentrated in our manner, taste full and thick, almost like Oil in the Mouth, and pour out like that, or a thin Syrup, being at the same time also heighten'd or concentrated in Colour.

From the preceding *Phænomena* it should seem natural, that these different Parts of *Wine*, which vary so much in Consistence and Tenuity of Matter, might be separated from each other by a commodious *Percolation*: so that the aqueous Parts, which appear the finest, should run through the Pores of a proper Strainer, and leave the grosser behind.

But the Practice hereof is clogg'd with great Difficulties: For,

First, Those thin Liquors which have a manifest and copious Saltiness, as *Wine* has, are either so attenuated, and their gross Part, however thick, in comparison of Water, is yet so subtle and penetrating in itself, as at the same time to pass the Pores of any ordinary Strainer; at least, such Liquors will, along with their Aqueous, transmit the finest and most delicate of all their Parts, and leave the more sluggish, the truly grosser, or those most tending to Ropiness, behind.

It must also be observ'd, that most kinds of *Wine*, besides their genuine, substantial, rich, and essential Part, have constantly join'd with them some foreign, superfluous, and prevailing gummy or mucilaginous Matter; which the more it inviscates the nobler Part, the thicker and grosser it actually becomes; whilst the other finer Portion, which is not clogg'd with

such a Load, remains more penetrating and active.

And hence also the Difficulty of condensing *Wines* by *Percolation* is increas'd, as this subtle spirituous Part passes the Strainer along with the Water.

A contrary Difficulty attends the Use of a close Strainer, arising from the gross, mucilaginous Particles, either accidentally interspers'd in the *Wine*, or cleaving to this and other fermented Liquors, but especially Malt Drinks; for these viscous, tenacious and clammy Particles presently clog and stop the Pores of the Strainer, and by that means hinder the thinner and more watery Particles from getting away, and the natural Tenacity or Clamminess of Liquors prepar'd from Malt, Honey, and the like, communicates, in the manner of a Mucilage, such a Ropiness, even to the superfluous Water, and diffuses and expands itself so much therein, that the Water itself is thereby thicken'd, and render'd much less apt to flow.

A third Difficulty attends this Method by *Percolation*, viz. that altho' it were possible to make the Separation, yet the Work would proceed so slow, that the more subtle, not so strictly inflammable as fine, brisk, volatile, and spiritous Parts, which give the pungent Taste and Odour, might, in the mean time, exhale, and leave the remaining *Wine* flat and vapid: Or if this Inconvenience could be prevented, yet in so tedious an Operation some prejudicial fermentative Operation would, in all Probability, happen.

And after all, there would still remain a Question, as to the Matter to be used to the Strainer; which they, who have never made any Experiment that way, might little dream of.

For as the common *Filters* or *Strainers* are generally made of Paper, Linen, or some kind of Cloth, all these readily communicate and impress a foreign disagreeable Taste to the Liquor, especially to *Wine*, if intended for Condensation in this manner.

And it may seem surprising, that even a momentaneous Passage of condensed *Wine* thro' the cleanest Linen, will give it a remarkable and very disagreeable Taste of the Bag, that shall continue for many Months.

This happens in a much greater Degree to condens'd *Wine*, after the same manner as the highest rectify'd Spirit or Alcohol of *Wine* will, in many Cases, perform a Solution immensely quicker and more powerful than such a phlegmy Spirit, tho' mix'd but with a tenth Proportion of Water: For so our concentrated, or, as we may call it, rectified *Wine*, being freed from its superfluous Phlegm, has a more powerful, more immediate, and more intimate Effect upon the Parts of the Cloth, and other Bodies, by means of the Concentration of its spirituous and saline Parts, than when its Efficacy is weaken'd by being diluted with Water.

This Method, however, by *Percolation*, tho' no way sufficient to free the *Wine* of all its superfluous Water, may yet be of some small Service, if apply'd with due Regard to the Difference there is between fermented Li-

quors

quors, especially in point of Consistence; and therefore some faint or imperfect Imitation of our Method may be had by means of such Paper Filtres, or other common Strainers.

And in this View, that common Tavern-trick, with a Piece of Lint, when dexterously perform'd, might be of some Service: For if a long, thick Woollen String be first soak'd in Water, and then one End of it plung'd into *Wine*, whilst the other End hangs a great way down without the Glass, it will, in an imperfect manner, draw away the Water from the *Wine*.

But all these, and the like Attempts are trifling and useless in Comparison of our easy, expeditious, and perfect manner of effecting the Thing: To which we next proceed.

Of the Method of condensing Wines, and other saline, spirituous Liquors by COLD.

Having shewn above what effect the Motion of Heat and the Action of Fire have upon all fermented Liquors, and especially upon the finer Parts of them, and more directly upon those of *Wine*; and how much they contribute to dissolve the intimate Union of vinous Fluids, and change their whole Nature, which consists in that Union and Connexion; we pass on to the Consideration of *Cold*, which being opposite to *Heat*, may be suppos'd to have different Effects, or at least such as better suit the present Purpose.

If any kind of *Wine*, but rather such as has never been adulterated, be, in a considerable Quantity, as that of a Gallon or more, expos'd to a sufficient Degree of Cold in frosty Weather, or in any Place where the Ice continues all the Year, and so be brought to freeze; the superfluous Water contain'd in the *Wine* will be turn'd to Ice, and leave the proper and truly essential Part unfrozen, unless the Degree of *Cold* should be very intense, or the *Wine* but weak and poor.

3. When the Frost is moderate, the Experiment has no Difficulty, because in that Case not above a third or fourth Part of the superfluous Water will be froze in a whole Night; but if the *Cold* be very intense, the best Way is, at the End of a few Hours, when a tolerable Quantity of Ice is form'd, to pour out the remaining Liquor, and expose it to freeze afresh by itself. And,

1. Because when the Quantity of Ice grows large, more of the concentrated *Wine* will be apt to hang and lodge in it.

2. Because it would otherwise require a longer time to drain away from the Ice.

If the Vessel that thus by degrees receives the several Parcels of condens'd *Wine*, be suffer'd to stand in the cold freezing Place where the Operation is perform'd, the Quantity lying thin, in pouring out, or otherwise, will be very apt to freeze anew; and if it be set in a warm Place, some of this aqueous Part thaws again, and so weakens the rest.

The condens'd *Wine* therefore should be emptied in some Place of a moderate Temper, as to *Cold* and *Heat*, where neither the Ice

may dissolve, nor the vinous Substance mix'd among it be congealable: But the best Expedient of all is, to perform the Operation with a large Quantity of *Wine*, as that of several Gallons, where the utmost Exactness or Prevention of all Waste need not be so much regarded.

By this Method, there freezes about one Third of the whole Liquor, and is properly the more pure aqueous Part thereof; insomuch, that when all the vinous Fluid is pour'd off, to be again expos'd to a farther Concentration, the Ice remaining behind, upon this first emptying, being set to thaw gently in a warm Place, dissolves into a perfectly aqueous Fluid, retaining only a light Scent, but extremely little of the Taste and Colour of the *Wine*.

If the *Wine* now once concentrated, should by longer Continuance in the freezing Cold, be again congeal'd to the utmost (unless the Cold were very severe indeed), and then again be drain'd from the Ice, there soon after falls to the Bottom of the Glass it is pour'd into, a gross, white and shining Powder or Tartar; and even the icy Part remaining behind, deposits a little more of this Powder, after thawing: and again, the same vinous concentrated Matter does the same upon standing a few Days or Hours; but the more of it, as the *Wine* was austere or genuine, neat and unadulterated with Sugar, Brandy, or the like.

The Ice of the second Operation differs in no respect from that of the first, provided the vinous Matter be perfectly drain'd away from it before the Ice is set to melt; whereby it runs into the very same kind of Phlegm, excepting only when the *Wine* was less spirituous, that it tastes a little more saline than the Water separated by the first Operation.

The Part which has escaped being frozen in both Operations, is a real concentrated *Wine*, as appears by its Colour, Consistence, Taste and Smell: For it has now all those Properties in a greater Degree, and a much narrower Space, than when so largely diluted with a superfluous Water; and therefore becomes a much nobler and richer *Wine*, than without such a Contrivance could possibly be procured: For as by this means two third Parts of Phlegm are taken away, in the better Sort of *Wine*, or three Fourths in the weaker, what remains, must needs become highly rich and saturate.

This Operation, though it be perfect in *Wine*, does not succeed altogether so well in rich Malt Liquors.

Thus for Example; Having by several Condensations reduced a full Gallon of strong Malt Liquor to the Quantity of a Pint and a half; the Ice separated from it in the first Concentration, resolv'd into a Liquor, somewhat of the Colour and Taste of small Beer; and that obtain'd at last might have almost pass'd for small Beer, tho' a flashy, watery Taste manifestly predominated in it: But the Part that remain'd uncongealed was extremely rich, and for Consistence and Taste, far exceeded the famous double *Brunswick Mum*.

In point of Strength or Spirituosity, it seem'd perfectly aromattick and nobly flavoured; a thing not found in common Malt Liquors, and for Consistence, it resembled a dilute Syrup, and with a pleasing Softness, sheathed the Acrimony of the Spirit, and concealed the Bitterness of the Hop, which before was very considerable.

The mucilaginous Nature predominant in all Malt Liquors, here occasions a greater Inaccuracy; as not suffering the condensed Part to get clear and run from the Ice: But as this Liquor is cheaper than *Wine*, the Loss is less considerable, and not only so, but if the Operation were to be performed in large, the thaw'd Liquor might be commodiously employ'd in a fresh Brewing; so that with a slight Encharexis, all manner of Loss may be prevented.

And thus likewise the Phlegm of *Wine*, separated in the Operation, may, by a proper Ferment, be converted into good Vinegar, with a great deal of Ease and moderate Profit.

What a large Quantity of Water abounds in Vinegar is well known to those that are skill'd in Chymistry; so that a great Quantity of Vinegar will saturate but a small one of Alkaline Salt: And again, a deal of Vinegar is required to dissolve a little Quantity of Metal.

A Pint of the strongest Vinegar will scarce dissolve above two Drams of Iron; or saturate more than the like Quantity of good Salt of Tartar: But our Method of Condensation effectually remedies this Inconvenience, and so far deprives the Vinegar of its superfluous Water, and collects its acetous, penetrating Sharpness, as to render it extremely powerful; thus throwing out five or six Parts of useless Phlegm, that tastes scarce perceptibly acid, and at the same time retaining the Strength and Virtue of the Whole, in the Part remaining uncongeal'd.

The Advantages of the Method of condensing Wines by Cold.

'Tis certain that the best and noblest *Wines*, if exposed for several Days to the warm open Air of the *Summer*, out of a Vault or other proper Receptacle, will inevitably corrupt and spoil, throwing a mouldy and mucilaginous Matter to their Surface, and acquiring a Degree of Stench or Vapidity, or at best turning to Vinegar: On the contrary, the *Wine* condensed in our Manner, suffers none of these Changes, upon being so exposed; but remains for a long time not only uncorrupted, but even unaltered, as we have experienced for several Years.

And as this Difference is owing to nothing more than freeing the *Wine* of its superfluous Water; it may hence be fairly presumed, that Water alone is the principal or immediate Instrument of all the fermentative Motions and Changes of vinous Liquors.

We condensed in our Method a Gallon and

Half of poor, weak, austere and acid *Wine* to about a Quart, in the *Winter* of the Year 1696, and put it into a Glass Bottle, whereof a third Part remained empty; and stopped it only with a hard Wreath of Paper; and thus it stood for the Space of two Years in my Bed-chamber, where during the *Summer*, when the Weather was fair, the Windows were open all Day long; and where also in the *Winter* other aqueous Liquors froze. During this Time, it was often opened, and some of it poured out, both to taste and otherwise to use; and yet in all this Time it neither grew mouldy or sour, nor suffered any Separation of Parts; only deposited a small Quantity of Tartar, but retained its original Consistence and Taste intire; excepting some small Change in both for the better.

In the same Manner we concentrated a somewhat better Kind of *Wine* to a little more than a fourth Part; but the Bulk of this did not keep so well as the former, as having many more Tasters, than that austere and disagreeable Sort.

When it was by degrees tasted away to half a Pint, I put the Remainder into a Glass, and tied it over with a Piece of Bladder, then set it in the same Place, near the former; but could not prevent its being sipp'd away by degrees, till only about three Ounces were left.

This small Quantity stood all the *Summer*, barely covered with a loose Bladder, without Alteration, or growing in the least mouldy or acid, and long after retain'd its most grateful Taste and quick Smell; only the latter was somewhat weakened through the Bottle's remaining untied down: And that under this Inconvenience it should continue so perfect and intire, is very surprizing.

I had in the *Winter* of the Year before, condensed a very small Quantity of the same Sort of *Wine* to half an Ounce, and put into an Ounce Phial, which remain'd lightly tied down all the next Year in my ordinary Stove-Room, where it kept without corrupting, till after the End of the *Winter*, when by the unequal, and sometimes violent heating of the Room, it became vapid and mouldy.

A parcel of Vinegar concentrated after the same Manner in the *Winter* 1694, and by that means brought to a corrosive Degree of Sharpness, which rendered it unfit for the Table, stood in the same Room with the concentrated *Wines*, for three whole *Summers* and *Winters*, without any manner of Tendency to Corruption, or the smallest Sign either of Mouldiness or Ropiness.

These Examples and Experiments sufficiently shew, that Liquors thus concentrated, may, for a long time, be kept in a State of Perfection with little Care.

But there are some particular Changes of *Wines* and Vinegars, thus concentrated, that happen in process of Time.

1. *Wines*, upon being thus concentrated, seem to acquire a more austere Taste than they had

had originally ; and no Wonder, as the Condensation brings their saline and rough Matter into a third or fourth of its original Compass ; so that this is no new Addition or Increase of the rough Taste, but perhaps some Degree of Mitigation thereof, in regard of the Closeness whereto this rough Matter is brought ; which of itself ought rather to multiply the Effect in a greater Proportion.

The Change may be conceiv'd owing to this, that all *Wines* are observed to grow mild and soft by long lying ; which Effect is greatly promoted in them by a successive Separation of their Tartar, and a gentle Evaporation of some Part of their Water ; occasioning that Necessity we find of frequently filling up the Casks in the *Summer* Months : But in our concentrated *Wine*, though some Tartar be successively separated, yet there is found no concurrent Evaporation ; for the concentrated *Wine* grows soft and mellow in a well-stopp'd Glass, where no sensible Diminution of the Quantity is perceived.

But the Effect proceeds principally upon a closer Combination of the grosser with the spirituous Part ; which now wanting Water, successively throws off the grosser Tartar from the rest of the Mixture.

But besides this, there seems to be another remarkable Change incident to our concentrated *Wines*, not only in the Taste, but abundantly in the Smell ; for although that very austere *Wine* above-mentioned, had a much milder Taste the third Year than the second, yet its specifick Odour perfectly resembled that of *Sack* and *Canary*, so as to be mistaken for it, from the Smell alone, by good Judges, who were acquainted with the original Flavour of the *Wine* from whence it was concentrated.

Nor is this Change of Odour peculiar to *Wine* alone ; but concentrated Vinegar participates somewhat of it, and was observed for some time to lose it in great measure, upon being left long stopp'd only with Paper ; and the Bottle often poured out.

And therefore as 'tis plain that *Wines*, and all other fermented Liquors, become much more durable by Concentration, and yet this Durability is here confirm'd and prov'd from small and inconsiderable Quantities, wherein they always retain their Goodness, it is obvious, that if the Operation were perform'd in large, a great Bulk of the Liquor thus concentrated, would be still immensely less subject to Alteration, from the Air and Heat ; which are the two great Incentives to fermentative Motions ; and that if such small Parcels suffered no Change for the worse, much less would the larger.

But as these concentrated Liquors, by reason of their considerable Proportion of saline and fine spirituous Parts, have a less Tendency to Dissolution and Corruption ; so on the contrary, the aqueous Part separated from them, has a very strong Tendency thereto ; for as it takes from the *Wine*, and carries off with it a little of the mucilaginous and unctuous Part, and yet is almost wholly a

mere moveable fluid Water, that is the most active Instrument of fermentative Motion, it cannot but presently fall into Corruption.

This Business of Congealation is not only applicable to immediate Profit ; but also paves the Way to certain Matters of Curiosity ; and shews one Particular, which though not new, but antiently common and familiar, has yet grown strangely into Disuse, through the Indolence of Mankind.

As to the Point of immediate Use, it needs no Explanation ; for he must be very dull, indeed, who does not immediately perceive that *Wines*, &c. by this Method may be reduced to any Degree of Vinosity, Strength or Perfection.

Thus for Example ; If a *Wine* of a moderate Strength, have a third Part of its Water taken away, in the Form of Ice, by Congealation, the remaining Part will thereby be doubled in Strength and Goodness : For if in the better Sorts of *Wines* we allow, as we may, one third Part to be good or truly vinous, and two third Parts to be Water ; then that one third good Part is divided among the two aqueous Parts ; whence, if one of the two aqueous Parts be taken away, that same third Part before divided between the two Waters, now remains collected or condensed, in a double Proportion along with but one of them.

But if this Condensation be carried up to the utmost, and practis'd in a large Quantity, with a somewhat intense Cold, it may, perhaps, reduce good *Wines* to a Sixth, and this small Quantity might commodiously be us'd as a Quintessence, to meliorate, improve, and even specificcate smaller and low-flavoured *Wines*.

To conclude, as to the direct and immediate Use of our Method of Condensation, he who has the Secret, by means of a little, dry, powdery Body, of turning Water into *Wine*, will not, perhaps, easily divulge the capital Use he may make of this Experiment.

WINE-PRESS. *A Description of the great Taisson or framed Press.* The Press, which is a Machine or moving Power, contrived to squeeze the Juice out of Grapes, consists of an Assemblage of many Pieces of Timber, placed after different Dispositions, which compose three Bodies of Timber-work, closely joined to the Axis, which serves as a Swing, whereby it may be moved by the Vice.

The great Presses are Thirty or Thirty-three Feet long, and Twelve or Sixteen wide. To make one of these Machines, they first dig a Pit in the Ground about four Feet deep, and sixteen Feet square, in the most commodious Place where the Press is design'd. In the Middle of this Hollow, they build a small Pile of Mafonry the whole Length for a Foundation, two Feet thick and three Feet high, in such a Manner, as to have only one Foot below the Surface of the Ground ; then they make a parallel Wall to surround the Press from the Right to the Left to the Extremity

tremitry of the Pit, at an equal Distance from the Pile in the Middle, for supporting some of the Timbers, and to prevent the Earth from falling down into the Pit. The Space between these three little Walls of three Feet depth, is necessary to give Air to the Wood, to prevent its rotting.

The Wall, which ought to be from the Sides of the Beams (which may be placed from the Right to the Left of the Press, according to the greatest Conveniency of the Place) should be deeper than the Hollow of the Beams, which shall be explain'd hereafter; and that which is contriv'd on the bent Side of the Beams, should be thicker than the Square of the Bason, which will be more easily comprehended by what follows.

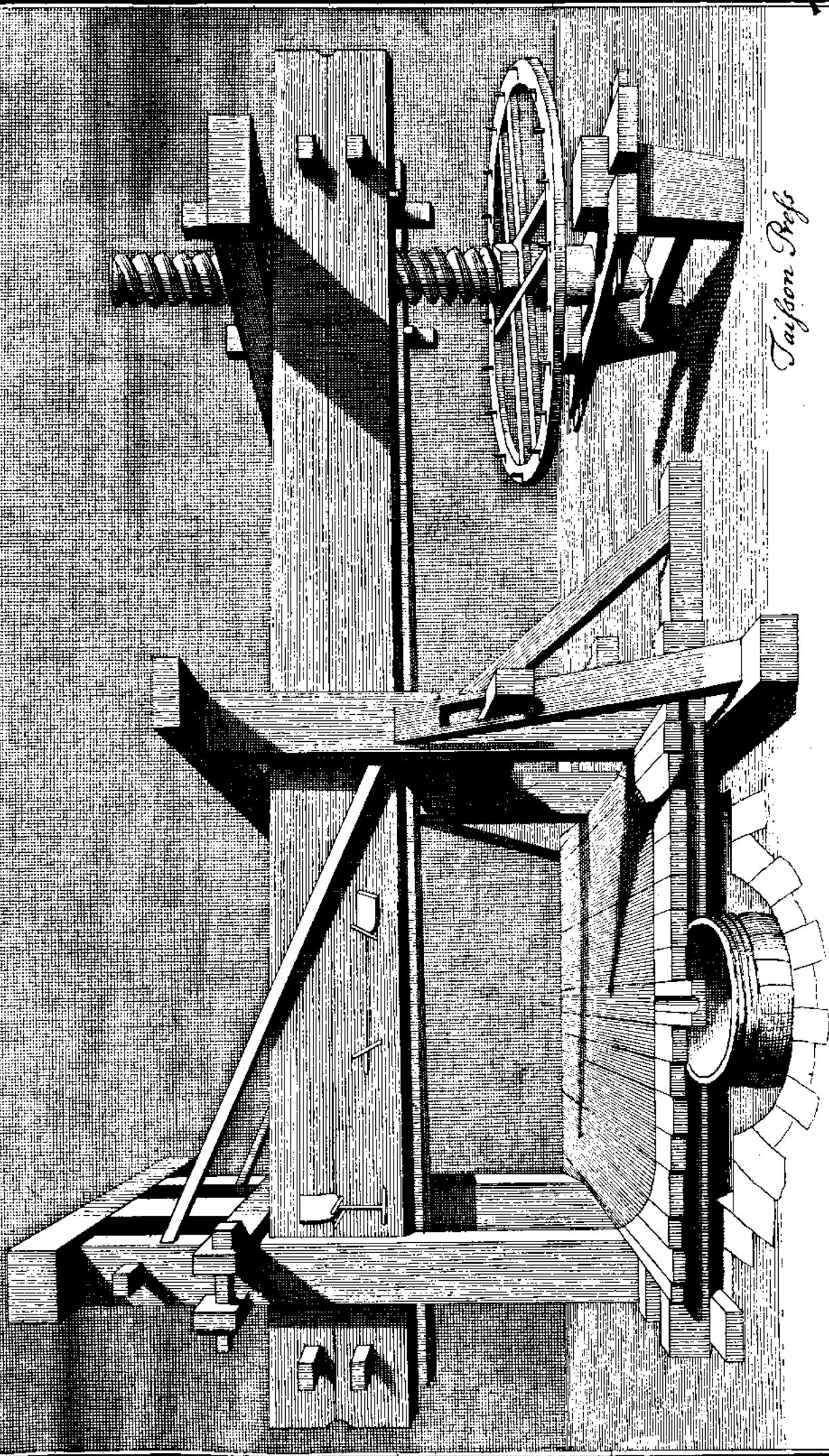
Upon the little Wall of the Middle, they lay a Piece of Timber length-ways, which they call a *false Stilling*; upon this, to the Side of the hollow Beams, they place a Ground-plate, which is supported by another Pile of Masonry, where is joined close to the Beams the Piles which they cross; all these Pieces should be laid level, in order to support four Stillings, which are placed across them at an equal Distance. These Pieces ought to extend beyond the Wall of the Bason, on the Side of the Beams, about three Feet, and be laid upon the Piles to hinder them from rising: There must always be allowed a Declivity of three or four Inches from the Front to the four Stillings, in order to facilitate the Draining of the *Wine* into the Cask, which should be placed under the Middle, in the fore Part of the Bason, to receive it from the Side where the Holes are bored.

They afterwards place upon these four Stillings, cross the Bason of the Press, some Pieces of Wood called *Maye*; these should have their Tops level with the Top of the Stillings, and ought to be cut in Notches of four Inches in length on both Sides the Bason, for receiving the *Maye* in such a manner, that they may be fastened on each Side with Wedges, after having put in the middle of the Joints, Potters Earth and Moss, to prevent the *Wine* from getting out at the Crevices: These Pieces of *Maye* are simply join'd together without Fillets or Notches, that they may the better close the two Ends to the Middle of the Quoins their whole Length, between the Stillings and the Side of the last Pieces of *Maye*: These Pieces should be raised in the Middle with a Ridge, to make a Gutter in each Joint, to facilitate the draining of the *Wine*; they also make for the same Purpose, a Ridge or Furrow all round the Extremity of the Pieces of *Maye*.

In the Place appointed for the Beams, on the Right or Left of the Bason, they make a Hole big enough to erect a Frame of Masonry twelve Feet deep, eight long, and five broad; one of the three Piles of Masonry, which supports the Bason, serves there instead of one Side of the Wall to the Beams, which are drove into the Ground at the Bottom of the said Frame, twelve Feet deep, and are fifteen or sixteen Feet above the Level of the

Ground. These they join with the Piles which cross 'em, upon which they put the Beams, which are all joined by Cramps of Wood, except the last, to which the Stillings serve instead of Braces: They afterwards erect the Masonry, in which they enclose the Ends of the Piles, as also those of the Braces, to prevent the Beams from rising; these Piles ought to be placed contrary to the Stillings, which surround or cross them every three Feet, and Dove-tail'd into the square Supporters; the Space left between the Masonry they do not fill up, that the Beams may be preserved from rotting, and that, if Occasion be, they may go down into the Pit. The Beams ought to be laid in such a Manner, that their Sides may occupy the Middle of the Bason, and they should incline two Inches beyond it: The Front and Sides must be made smooth and even; but the Back and Tops must be left rough: They make at Top, under the Pieces of *Maye*, a Step of two or three Inches, for Support to the Carriage; the Top of the Beams is joined with a Cross-beam, under which is a Spindle supported by a diagonal Beam, on which all the Force and Resistance of the Press bears; this diagonal Beam should be closely fastened with Nails and Girders under the Heads of the Beams: In the Middle of the other Side of the Bason, they put upon the Ground-plate, between the Ends of the Stillings, two false Beams a little Distance from the true ones, because it is on this Side that the Axle Tree is notched to receive the Beams, to prevent their recoiling back; these are a little enlarged towards the false Beams; they sustain these with four cross Pieces or strong Jambs, two on the Front, and two on the Sides, which abut against them, and keep them in their Places; these cross Pieces are borne by the Ground-plate and the Posts, and let in at the other End, just to the Middle of the false Beams; these ought to be bored about four Feet high, that the moving Pins may be put in there for the Beam to rest upon: These false Beams should have Holes at their Bottoms, to receive the wooden Pegs which cross the Ground-plate, and are cut to half their Thickness, that they may be capable to enter the Notches, and be joined with Keys and Pins where they cross the false Beams; they likewise bind these Beams at the Top with a cross Beam, and they sustain them again at the Bottom with two cross Pieces on their Sides; these cross Pieces are placed upon the Posts which are joined into the Ground-plate by a Dove-tail, and are borne up horizontally by a small Piece of Masonry of their own Size, which is chiefly hid in the Ground: There must also be on each Side a large cross Piece to cross the Bason, which binds together the false Beams with the true, both before and behind; these they fasten to the Top of the Beams, allowing them a Foot and half Declivity to the Place where they are mortised into the false Beams.

They also make in the Ground, on the Sides of the false Beams, ten Feet from the Bason, a Pit twelve Feet deep, and ten Feet square,



Tailor's Press

The Great Press

Place this plate at S.S.

square, for to place the two Blocks which should join at Bottom, and be separated by the great Ends, about two Feet above the Surface of the Ground, in such a Manner, that the Screw may be able to play between them; these must be joined at Bottom to the Piles by a strong Dove-tail, and the Piles joined with Braces; and near the Top, about fifteen Inches from the Head, they should be bound with Girders and Pins to keep them asunder, and prevent their parting: The Space between the Blocks and the Piles must be filled up with Earth, which should be well rammed; these Girders should be let in seven or eight Inches to the Body of the Blocks.

In the Middle of the Girders there should be a Hole to put in the Screw, which should there descend perpendicularly, and which is rounded to this place, and lessened to a third Part of its Thickness; and a Foot lower than the Girders ought to be a Rail plac'd as a Support, from Bottom to Top, in a Slope, for a Rest to the Screw; there should be on this Rail a Plate of Iron, and an Axis to the Screw for its Play: The Screw must be twelve Feet long, and thirteen Inches thick at the Top; the Screw-tap, or the Extremity of the Spiral Line, ought to be three Inches and a Half, and should form an exact Square; the Screw should pass cross a Wheel, which is placed three Feet from the Surface of the Ground, and which in this Place should be square, and about an Inch and a Half of its Thickness pared off for the Play of the Wheel: This Wheel should be joined with Spokes and Curbs athwart, into which they put divers Pegs, that they may be able, with five or six Men, to give it the necessary Motion.

Lastly, there should be placed at five Feet from the Bottom of the Basin, two great Beams, which must pass between the true and the false Beams; these must be both squared and pared away at the great End, on those Sides where the Beams touch, where they let them into a Notch, to prevent their coming out, and at the back Part they put a Key to secure them from being displaced (for they cannot put them into it) but nevertheless in such a Manner, that they may play between the Beams, without changing their Position: These Beams should be well fitted to their Bed, and joined with Keys, that they cannot part from each other, for they should open insensibly from the false Beams, where they ought also to separate to the right of the Screw, to give Place for it. Upon the End of these Beams, must be joined the Nut of the Press with moveable Keys, that by this Means it may be raised or lowered, so that the Beams may rise and fall as a kind of Swing, which has the Keys for its Center, which are the false Beams, where the great Beams do rest, and the Bag which is upon the Basin. When they press, before the Press-man raises the Beam, by means of the Screw, they lower it on the Sides of the false Beams a little, that they may force the Quoins between the Beams and the Spurs, which is upon the false Beams; then they lower it with the same Screw from

the Side of the false Beams: After they have moulded the Grapes with the three Poles, the Planks and the Nave, by the Help of the Wheel which moves the Screw, they press the Bag strongly.

These Beams should be two Feet and a Half thick, and if that is not big enough, they put two upon each other, and sometimes three, if it be necessary: These they join together with Nails in different Places, both on the Bed and in Front, that they may work together, as if there were but two; and they raise at the End of the Press, on the Side of the false Beams, a small hanging Scaffold or Steps, to go up to strike the Quoins.

Of the great Framed Press.

This Sort of Press is made like the other, except that instead of the Blocks they use a Frame. They make a great Pit in the Earth twelve Feet deep, and nine Feet Diameter, and to support the Earth, they build a Wall of Stone all round it in the Form of a Well, which ought to be seven Feet Diameter, that they may place in this Space a Frame of Wood-work of a square Figure, joined together with Posts, Joynes, Ground-plates and Rafters like a St. Andrew's Cross: In this Frame they put a solid Stone Wall of about Three thousand Weight; then they join the Screw to the Center of the Frame, that they may be turned together, and to keep the Beams upon the Stock of the Wheel to press the Grapes, in such a Manner as if one Man was suspended at one End of a Pole which is made fast at the other, and in the Middle there is something to press. At about two or three Feet from the Ground is a Wheel, by means of which, and the Weight of the Frame, they make the Screw descend, which lowers the Beam. The Frame should be ten Feet high, and four Feet nine Inches square on each Front. Great Care should be taken of the Block Presses, not to screw them too hard, lest it break the Beams and split them to Pieces, nothing being of greater Force than a Screw: You must not fail to make the Dove-tails very exact; but above all, the Screw and the Nut should be made artificially to their Work.

These great Presses make at one Vat or Stowage, from Twenty to Twenty-five Pieces of Wine. One may make it less by a fourth Part, and it will press as well, when there is not above Ten or Fifteen Pieces of Wine: In this Case the Pieces should be proportionably diminished in the Bigness from what has been described.

The Names, Length, and Thickness of the Pieces which compose a great Press.

The main Beams from Thirty-two to Thirty-five Feet long, and one with another, from two Feet and a half to three Feet thick.

The Cheeks or Side-Beams Twenty-eight Feet long, about two Feet thick at the Bottom, and eighteen Inches at the Top.

The Piles twelve Feet long, and twelve or thirteen Inches thick: It must be observ'd to make these with counter Dove-tails to those of the Cheeks; the first is placed at fifteen Inches from the Bottom of the Cheeks; one ought to put three from the Top, to that which is in the Ground, and the latter should be even with the Top of the false Stillers.

Upon the Piles of the Cheeks, and upon those of the Blocks, are placed Braces of Wood nine Feet long, and about nine or ten Inches thick, to bind them together.

The Stillers six Feet long, and about fifteen or sixteen Inches square.

The Ground-plate eighteen Feet long, about eighteen Inches broad, and fifteen Inches thick.

The false Beams fourteen or fifteen Feet long, about thirteen or fourteen Inches broad, nine Inches thick at the Bottom, and six at the Top; these ought to be plain to the Size of the Keys, to support the main Beams.

The cross Piece of the false Beams six Feet long, four Inches broad, and nine or ten thick.

The Keys of the Beams to the Direction of the Worm, five Feet and half long, eight Inches thick towards the Head; but reduced to half the Size in the remaining Length.

The Pegs of the Keys, fourteen Inches long, about five broad, and at least one and a half thick.

The two cross Timbers of the false Beams about eight Feet long, four or five Inches thick, and the same Breadth of the false Beams.

The two other cross Timbers of the false Beams nine Feet long, and about eight Inches thick.

The Posts six Feet long, and about eight or nine Inches thick.

The Pieces of *Maze* which are at the Bason, twelve Feet long, about nine or ten Inches broad, and six thick.

The great cross Timbers, put as a Band between the false Beams, six or seven Inches thick.

The two Blocks fourteen Feet long each, about sixteen Inches thick at the Head, and twelve at the Bottom.

The Screw fifteen Inches at the Bottom before it is squared, thirteen Inches, according to the Foot of the Screw which forms the spiral Line, and twelve Feet long.

The Wheel ten Feet Diameter, with Spokes of four Inches thickness, the same as the Ribs, upon which are wooden Pegs for four or five Inches high, and one Diameter, admitting eight or nine Men in the Circumference of the Wheel.

The Nut of the Press six Feet long, two Feet broad, and fourteen Inches thick; which ought to be crested with Iron.

The cross Piece of the Cheeks six Feet long, about a Foot thick, and of the same Breadth as the Top of the Cheeks.

The Spurs, which are placed under the Spindle, between the two Cheeks, should be of the same Breadth as the Cheeks, and thirteen or fourteen Inches thick.

The Girders, which ought to embrace the Top of the Cheeks, must be two Inches higher than the under Part of the Spurs, one Foot broad, and about five Inches thick.

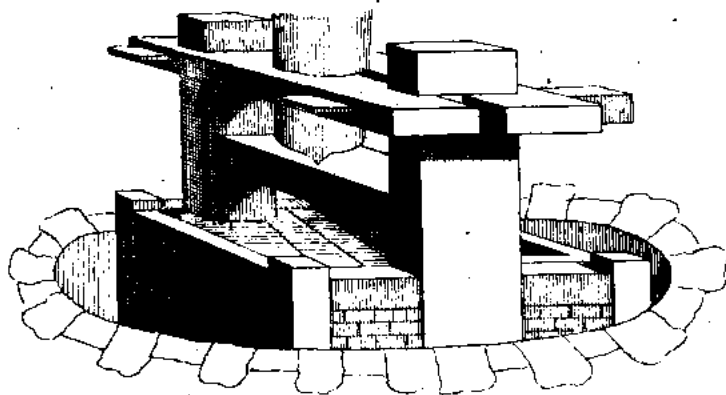
The Spindle two Feet high, and twelve or fourteen Inches thick: This is plac'd between the Spurs and the cross Piece, and do cross the Cheeks and the Spindle with a Key, which ought to be worked very exact, for there it is the whole Force of the Press resides.

The Quoins two Feet long, about nine or ten Inches broad, and six or seven thick.

The Frame, in the framed Press, ten Feet long or deep, and four Feet nine Inches square, with four Fronts.

The Nave eight Feet and a half long, about five Inches thick one way, and six the other.

All these Timbers should be Oak, except the Screw, which should be Elm, which will last longer; and the Spindle should be of Walnut. One may make the most Part of these Timbers longer or shorter, according to the Size of the Wood made use of.



The Framed Press

The Description of a slight Press.

This Sort of Press is much less chargeable than the others; and it also presses a much less Quantity of *Wine*; but it is nevertheless of great Use for private Persons, who have no great Vintage, where this will be sufficient, for it will make eight or ten Pieces of *Wine* at each Tunning.

The Construction of this slight Press, is much the same with that of the other Presses; but I shall explain wherein they differ.

The Pit which is made in the Earth, ought to be four Feet deep, fourteen broad, and eighteen long, more or less, according to the Size of the intended Press. They make three little Walls of Free-stone cross the Press, which occupies the Bottom of the Square of the Bason, they make the Walls in the Middle two Feet, and those on the Sides two and a half thick; an Opening must be left in the Middle of each of the side Walls, about twenty Inches square, to place the two Cheeks one opposite to the other on each Side of the Bason, which should incline an Inch and half towards the Bason: These must be squar'd and plain'd on three Sides, from the Top of the Stillings; but the Top should remain rough. In these Sides, which are toward the Bason, they make a Notch at the Height of two Feet and a half from the Bason, three Inches broad, four Inches deep, and two Feet high in ascending towards the Head.

They place the false Stillings upon the middle Wall, and upon each of the other they place two Piles, which embrace the Cheeks, and are joined to them by square Supporters and Dove-tails: In crossing the Piles and the false Stillings, they put the four Stillings in Notches, as in the other Presses; those of the middle embrace the Cheeks, and are joined to them as the Piles are, and should extend beyond the Piles which are behind the Cheeks, eight or nine Inches: The Top of the Stillings ought to be notched an Inch and a half, fit to receive the Piles to keep the Whole together; then they put upon these the Pieces of *Maye*, which they close, as hath been already said, and the Bason is the same with the other Presses.

The Spindle of the Screw ought to be seven or eight Inches longer than the Back of the Cheeks, and embrace them in their thickest Parts; this is placed upon them, and supported upon the Keys, which cross the Cheeks, by Nails: This must be stay'd behind the Cheeks with a Key, and in Front with four Iron Bars, making a Square of a Foot and half, bored at the four Corners with Pins and Nails four or five Inches long towards the Screw-tap. Upon the Spindle they lay Planks of the same Length, which they cross in such a manner, that their Ends are turned toward the Front of the Press: Upon these Planks they lay two cross Pieces of the same Length as the Spindle, which embrace the Top of the Cheeks under their Heads, they let them in at each End in Front, where they are joined. These cross

Pieces and the Cheeks ought to be nailed together; and they must put four cross Timbers, which should take hold of the Head of the Beams, and reach half the Length of the Head-pieces for a Support to each.

They afterwards make a Screw with the same Instrument as that of the other Press, with a Square at Bottom, to join it to a Wheel, which should be laid horizontally, well consolidated with the Screw, and joined with Ribs and Spokes a Foot wide cross-wise; these Spokes ought to project out of the Ribs three or four Inches of half their Width, to be able to contain the Rope, which must be round the Wheel. Under the Center of the Wheel, they place a Standard of the Length of the Space between the Cheeks, and eight Inches thick or more, to make a sort of Tenon at each End, which goes into the Notch of the Cheeks. The Standard should be sustained by an Iron Pin, which goes in at the End of the Screw, to be held suspended by it, in such a manner that it may waggle: In order to this, the End of the Pin, which is under the Standard, should play with the Key which holds it at the other End in the Screw.

At ten or twelve Feet from the Press they place a Wheel, either horizontally or perpendicularly, with an Axle-tree, which ought to play in the Flyers of Wood well fixed; they bind to the Wheel which is at the Top of the Bason, to one of the Spokes, or one of the Pins which is driven in for this Purpose, the Oeler-hole of a great Rope two Inches and a half Diameter. They can turn the Wheel once or twice round with the Hand, before they take hold of the Rope; the Rope ought to go round the Wheel five or six times, and be fastened at the other End to that which is at the Side of the Press. They employ seven or eight Men to turn this Wheel. It is of great Consequence to observe, that when there is no more than one Turn and a Half of Rope about the Wheel, and if there is another Bag to press, they should remit two or three Turns of the Rope to the Wheel to finish the Pressing, otherwise they would risque the breaking the Wheel at the Bottom, and laming the Pressers. When the Bag is sufficiently pressed, they stop the perpendicular Wheel for half an Hour, to allow Time for the *Wine* to drain off. In this sort of Press, there is nothing but the Standard Presses, which is born by the Nave, and supplies the Place of the great Beams which are in the other Presses. There ought to be one experienc'd Man, to whom the others ought to be obedient, to conduct the Pressing, and to cut and chop the Marc as often as it shall need.

The Particular Pieces of a slight Press.

The two Cheeks sixteen Feet long, and about eighteen or twenty Inches thick.

The Spindle fifteen or sixteen Feet long, about three wide.

The

The Head-piece sixteen Feet long, and about thirteen or fourteen Inches thick.

The Cross-Timbers six Feet long, and about six or seven Inches thick.

The Piles twelve Feet long, and about twelve or thirteen Inches thick.

The Screw seven or eight Feet long, about thirteen Inches thick to the spiral Line, and sixteen Inches at the Bottom, fitted to a Square; this should be notched in that Place two Inches, for placing the Wheel.

The Standard twelve Feet and a half long, seventeen or eighteen Inches broad in the Middle, and ten at the Ends, and eight or ten Inches thick in the Middle, reduced to six or seven at the Ends.

The middle Wheel nine Feet Diameter, and ten or eleven Inches thick.

The perpendicular Wheel of an equal Diameter, and five or six Inches thick in every Part of the Timber.

The Axle-tree ten or eleven Feet long, and eight Inches Diameter.

The false Stillings and the Pieces of *Maye*, ought to be the same as in the other Presses in every Part.

The Stillings eighteen Feet long, and the same Breadth and Thickness as in the other Presses.

The Nave, as in the other Presses, that is to say, seven or eight Feet long, and five or six Inches square.

This Description of the different Sorts of Presses which are used in *Champaigne*, together with the annexed Plates, will, 'tis hop'd, be sufficient to instruct a Workman how to erect either of the Sorts here exhibited.

WINTER. Prognosticks of a hard WINTER.]
The Lord Bacon gives these as Signs or Fore-runners of a hard Winter.

If Stone or Wainscot that has been used to sweat (as it is call'd) be more dry in the Beginning of Winter; or the Drops of Eaves of Houses come down more slowly than they used to do, it portends a hard and frosty Winter. The Reason is, that it shews an Inclination in the Air to dry Weather, which in the Winter-time is always joined with Frost.

Generally a moist and cool Summer betoken a hard Winter likely to ensue. The Reason is, that the Vapours of the Earth not being dissipated by the Sun in the Summer, do rebound upon the Winter.

A hot and dry Summer, especially if the Heat and Drought extend far in September, betoken an open Beginning of Winter, and Cold to succeed towards the latter Part of the Winter, and in the Beginning of the Spring; for all that time the former Heat and Drought bear the Sway, and the Vapours are not sufficiently multiplied.

An open and warm Winter portends a hot and dry Summer; for the Vapours disperse into the Winter Showers; whereas Cold and Frost keep them in, and transport them into the late Spring and Summer following.

The Country People have made this Observation, that those Years in which there are

store of Haws and Heps, do commonly portend cold Winters: The natural Cause of this may be, the want of Heat, and abundance of Moisture, in the Summer preceding, which puts forth those Fruits, and must of necessity leave a great Quantity of cold Vapours, undissipated, which causes the Cold of the following Winter.

When Birds lay up Haws and Sloes, and other Stores in old Nests and hollow Trees, it is a Sign of a hard Winter approaching.

If Fowls or Birds, which used at certain Seasons to change Countries, come earlier than the usual Time, they shew the Temperature of the Weather, according to that Country from whence they come, as the Winter Birds, Feldfares, Snipes, Woodcocks, &c.

If they come earlier and out of the Northern Countries, they intimate cold Winters likely to ensue with us. And if it be in the same Country, they shew a Temperature of Season like unto that Season in which they come; as Batts, Cuckoes, Nightingales and Swallows, which come towards Summer; if they come early, it is a Sign of a hot Summer to follow. Cold Dews and Morning Rains about *Bartholomew-tide*, and hoar Frosts in the Morning about *Michaelmas-tide*, foretell a hard Winter.

When Sea-Pyes flock from salt to fresh Water, it signifies a sudden Alteration of Weather to much Cold.

X E

XERANTHEMUM; of *Empo* dry, and *arsa* a Flower, q. d. dry Flower. *Clusius* calls this Plant *Ptarmica*, not because it causes sneezing, but because it something resembles the *Ptarmica* of *Dodoneus*. It is vulgarly call'd the *Immortal Herb*, because the Flower of it may be kept for many Years, for it has rigid Petals, which crackle as if they were Plates of Metal.] *Eternal Flower, or Ptarmica; vulgô.*

The Characters are;

It hath a scaly Silver-colour'd Flower-cup; the Flower is dry; the Disk consisting of many plain Petals, having no Embryo's affixed to them, yet are included in the same Empalement with the Florets; the Embryo's afterwards become Seeds, each having a leafy Head.

The Species are;

1. **XERANTHEMUM**; *flore simplici, purpureo majore. H. L.* *Eternal Flower, or Ptarmica*, with a large single, purple Flower.

2. **XERANTHEMUM**; *flore pleno, purpureo, majore, H. L.* *Eternal Flower, or Ptarmica*, with a large double, purple Flower.

3. **XERANTHEMUM**; *flore simplici albo. H. L.* *Eternal Flower, or Ptarmica*, with a single, white Flower.

4. **XERANTHEMUM**; *flore pleno albo. H. L.* *Eternal Flower, or Ptarmica*, with a double white Flower.

5. **XERAN-**

5. XERANTHEMUM; *flore simplici, purpureo, minore. Tourn.* Eternal Flower, or Ptarmica, with a lesser, single, purple Flower.

6. XERANTHEMUM; *flore purpureo, simplici minimo, semine maximo. H. L.* Eternal Flower, or Ptarmica, with a very small, single, purple Flower, and a large Seed.

These Flowers were formerly much more cultivated in the *English* Gardens than at present, especially the two Sorts with double Flowers, which the Gardeners near *London* did cultivate in great Plenty for their Flowers, which they brought to Market in the *Winter* Season, to set in Glasses in Rooms, to supply the Place of other Flowers, which are not easy to be procured at that Season; for these being gather'd when they are fully blown, and carefully dry'd, will continue fresh and beautiful many Months: But as there are no other Colours in these Flowers but White and Purple, so the Gardeners had a Method of dipping them into various Tinctures, so as to have some of a fine Blue, others Scarlet, and some Red, which made a pretty Variety; and if they were rightly stain'd, and afterwards hung up till they were thorough dry, they would continue their Colours as long as the Flowers endure'd.

All these Sorts are propagated by Seeds; which should be sown on a warm Border in *August*, observing to water and shade the Ground, if the Season proves warm and dry, until the Plants are come up; after which they must be kept clear from Weeds, and in dry Weather should be now and then refresh'd with Water. When the Plants are about two Inches high, they should be prick'd out into another Border under a warm Wall, Pale or Hedge, at about four or five Inches Distance from each other. In this Place, the Plants will endure the Cold of our ordinary *Winters* extremely well; and in the *Spring*, will require no farther Care but to keep them clear from Weeds; for they may remain in the same Place for good. In *June* they will begin to flower, and the Beginning of *July* they will be fit to gather for drying: But a few of the best and most double Flowers of each kind should be suffer'd to remain for Seed, which in about a Month's Time will be ripe, and the Plants will perish soon after, so that the Seeds must be annually sown in order to preserve them.

The Seeds of these Plants are many times sown in the *Spring*, but they seldom grow so well at that Season, nor will the Plants grow near so large, or produce near the same Quantity of Flowers as those which are sown in *Autumn*, for which Reasons that Time should be preferr'd. Besides, it often happens, that the Plants which do come up of the *Spring*-sowing, do rarely produce good Seeds, unless the Season proves very favourable.

XIPHION; [of *ἔξῃς*, or *ἔξῃς*, a small two-edg'd Sword with a sharp Point, because the Leaves of this Plant resemble a little Sword.] Bulbous Iris, or *Flower-de-Luce*.

The Characters are;

It hath a *Lily* Flower, consisting of one Leaf, and shap'd exactly like that of the common *Iris*: the Pointal is furnish'd with three Leaves, but the Empalement turns to a Fruit, shap'd like that of the common *Iris*, and the Root is bulbous, or consists of many Coats.

The Species are;

1. XIPHION; *Persicum, precox, flore variegato. Tourn.* Early Persian bulbous Flower-de-Luce, with a variegated Flower.

2. XIPHION; *angustifolium, flore albo, labio inferiori rictus aureo. Boerb. Ind.* Narrow-leav'd bulbous Iris, with a white Flower, and the lower Part of the Lip of a yellow Colour.

3. XIPHION; *angustifolium, cæruleo-violaceum, non odorum. Boerb. Ind.* Common narrow-leav'd bulbous Iris, with a blue, violet-colour'd Flower without Scent.

4. XIPHION; *angustifolium, flore luteo inodore. Tourn.* Narrow-leav'd bulbous Iris, with a yellow Flower without Scent.

5. XIPHION; *angustifolium, flore ex violaceo purpureo & cæruleo pallescente variegato, notata. Boerb. Ind.* Narrow-leav'd bulbous Iris, with a Violet purple and pale Blue variegated Flower.

6. XIPHION; *angustifolium, petalis repandis albis, erectis dilute cæruleis, incumbentibus pallide cærulescentibus. Boerb. Ind.* Narrow-leav'd, bulbous Iris, whose Flower hath white Falls, the upright Leaves of a sky blue, and the under ones of a pale bluish Colour.

7. XIPHION; *angustifolium, petalis repandis aureis, incumbentibus pallide flavis, erectis dilute cæruleis. Boerb. Ind.* Narrow-leav'd bulbous Iris, whose Flower hath yellow Falls, and the upright Leaves are of a sky blue Colour.

8. XIPHION; *angustifolium, flore majore dilute cæruleo. Boerb. Ind.* Narrow-leav'd bulbous Iris, with a large sky blue Flower.

9. XIPHION; *angustifolium, flore majore, dilute cæruleo, lineis rubris eleganter striato. Boerb. Ind.* Narrow-leav'd bulbous Iris, with a large sky blue Flower, elegantly strip'd with red.

10. XIPHION; *angustifolium, flore majore albo. Boerb. Ind.* Narrow-leav'd bulbous Iris, with a large white Flower.

11. XIPHION; *angustifolium, flore majore albo, lineis dilute cæruleo, & pictis violaceo distincto. Boerb. Ind.* Narrow-leav'd bulbous Iris, with a large white Flower, with sky blue Stripes, and spotted with Violet.

12. XIPHION; *angustifolium, flore majore saturate violaceo. Boerb. Ind.* Narrow-leav'd bulbous Iris, with a large deep violet-colour'd Flower.

13. XIPHION; *angustifolium, flore majore petalis repandis dilute cæruleis, erectis saturate violaceo. Boerb. Ind.* Narrow-leav'd bulbous Iris with a large Flower, whose Falls are of a sky blue, but the upright Petals are of a deep Violet Colour.

14. XIPHION; *angustifolium, flore majore, dilute cæruleo, petalis repandis flavis. Boerb. Ind.* Narrow-leav'd bulbous Iris, with a large sky blue Flower with yellow Falls.

15. XIPHION; *angustifolium, flore majore, saturatus violaceo stris rubris eleganter variegato.* Narrow-leav'd bulbous Iris, with a deep Violet-colour'd Flower, beautifully strip'd with Red.

16. XIPHION; *angustifolium, flore majore, petalis repandis dilute cæruleo, erectis flavo.* Narrow-leav'd bulbous Iris, whose Flower hath pale blue Falls, but the upright Leaves are of a yellow Colour.

There are many other Varieties of this Flower, which have been of late Years obtain'd from Seeds: Their Numbers are every Year so much increas'd that way, that it would be endless to enumerate them all, therefore I shall proceed to their Culture; in which I shall first begin with the Method of raising them from Seeds, that being the Way to obtain new Varieties.

Having procur'd a Parcel of Seeds from good Flowers, the Beginning of *September*, you should provide some flat Pans or Boxes, which must have Holes in their Bottoms to let the Moisture pass off: These should be fill'd with fresh, light, sandy Earth, and the Seeds sown thereon pretty thick, observing to scatter them as equally as possible; then cover them over about half an Inch thick with the same light, fresh Earth, and place the Boxes or Pans where they may have the Morning Sun till eleven of the Clock, and if the Season should prove very dry, they must be now and then refresh'd with Water.

In this Situation they may remain until the Middle of *October*, when they should be remov'd into a more open Position, where they may have the full Sun most part of the Day; in which Place they must abide all the *Winter*, observing to keep them clear from Weeds and Moss, which at this Season is very apt to spread over the Surface of the Earth, in Pots, when they are expos'd to the open Air.

In the *Spring* the Plants will appear above-ground, when, if the Season is dry, they must be now and then refresh'd with Water, and constantly kept clear from Weeds; and as the Season advances, and the Weather becomes warm, they should be again remov'd into their former shady Situation, where they may enjoy the Morning Sun only. When the Plants begin to decay, (which will be in *June*) they must be clear'd from Weeds and dead Leaves, and some fresh Earth sifted over them about half an Inch thick, still suffering them to abide in the same Situation all the *Summer* Season; during which time they will require no farther Care, but to keep them clear from Weeds until the Beginning of *October*, when they must be again remov'd into the Sun, and the Surface of the Earth lightly taken off, and some fresh Earth sifted over them.

In this Place they must remain all the *Winter*, as before; and in the *Spring* they must be treated as was directed for the former Year.

When the Leaves are decay'd, the Bulbs should be carefully taken up, (which may be best done by sifting the Earth through a fine

Sieve) and a Bed or two of good, light, fresh Earth should be prepar'd, into which the Bulbs must be planted, at about three Inches asunder each Way, and three Inches deep. These Beds must be constantly kept clean from Weeds and Moss, and in the *Spring*, just before the Plants come up, the Surface of the Beds should be stirr'd, and some fresh Earth sifted over them about half an Inch thick, which will greatly strengthen the Roots.

During the *Spring* and *Summer* they must be constantly weeded, and at *Michaelmas* the Earth should be again stirr'd, and some fresh sifted over the Beds again as before, observing in *Winter* and *Spring* still to keep the Beds clean, which is the whole Management they will require, and in *June* following the greatest Part of the Roots will flower; at which time you should carefully look over them, and put down a Stick by all those whose Flowers are beautiful, to mark 'em; and so soon as their Leaves are decay'd, these Roots may be taken up to plant in the Flower-Garden amongst other choice Sorts.

But the Nursery-beds should still remain, observing to keep them clear from Weeds, as also to sift fresh Earth over them, as was before directed; and the following Season, the remaining Part of the Roots which did not flower the last Season, will now shew their Blossoms so that you may know which of them are worth preserving in the Flower-Garden, which should now be mark'd; and when their Leaves are decay'd, they must be taken up and planted with the other fine Sorts in an East-border of light, fresh Earth; but the ordinary Sorts may be intermix'd with other bulbous-rooted Flowers in the large Borders of the Pleasure-Garden, where, during their Continuance in Flower, they will afford an agreeable Variety.

But after these choice Flowers are obtain'd from Seeds, they may be increas'd by Off-sets as other bulbous Flowers are. These Off-sets should be planted in a separate Border from the blowing Roots, for one Year, until they have Strength enough to produce Flowers, when they may be plac'd in the Flower-Garden with the old Roots.

These Bulbs need not be taken up oftener than every other Year, which should always be done soon after their Leaves decay, otherwise they will send forth fresh Fibres, when it will be too late to remove them; nor should they be kept long out of the Ground; a Week or Fortnight is full enough; for when they are kept longer, their Bulbs are subject to shrink, which causes their Flowers to be weak the following Year.

The Earth which these Flowers thrive best in, is, a light, sandy Loam; and if it be taken from a Pasture-Ground, with the Sward, and laid in a Heap until the Grass is thoroughly rotted, it will be still better, for these Bulbs do not delight in a rich, dunged Soil; nor should they be planted in a Situation where they may be too much expos'd to the Sun, for in such Places their Flowers will continue but a few Days in Beauty, and their Roots are apt

apt to decay; but in an East Border, where they have the Sun until Eleven of the Clock, they will thrive and flower extremely well, especially if the Soil be neither too wet or over dry: From the most beautiful of these Flowers, should be Seeds saved, and sown every Year, which will always furnish new Varieties, some of which will greatly exceed the original Kinds.

The *Persian Iris* is greatly esteem'd for the Beauty and extream Sweetness of its Flowers, as also for its early Appearance in the Spring, it generally being in Perfection in February or the Beginning of March, according to the Forwardness of the Season, at which time there are few other Plants in Beauty.

This may be propagated by Seeds, in the same Manner as the other Sorts, but the Boxes in which they are sown, should be put under a Garden Frame in Winter, to shelter them from hard Frosts, because while the Plants are young they are somewhat tender: From the Seeds of this Kind I could never obtain any Varieties, their Flowers being always the same.

These Plants are also propagated by Off-sets in the same Manner as the other Sorts; but their Roots should not be transplanted oftener than every third Year, nor should they be ever kept out of the Ground long, because their Roots will intirely decay in a short time, so as not to be recovered again. This Sort was formerly more common in the Gardens near London than at present, which I suppose has been occasioned by the keeping the Roots above Ground too long, which destroy'd them.

XYLON; [ξύλον, Wood] The Cotton Plant.

The Characters are;

The Flower consists of one Leaf, cut into several Segments almost to the Bottom, and is of the expanded Bell-shape; from the Center rises a hollow pyramidal Tube, adorned and loaded for the most part with Chives; from the Empalement shoots up the Pointal fixed like a Nail in the Bottom of the Flower; and of the Tube, which is afterwards changed into a roundish Fruit, divided into four or more seminal Cells, gaping at the Top, and enclosing Seeds covered over with, and wrapped within that soft ductile Wooll, commonly known by the Name of Cotton.

The Species are;

1. XYLON; *frve Gossypium herbaceum*. J. B. Herb or Shrubby Cotton.

2. XYLON; *Americanum, præstantissimum, semine virecente*. Ligon. The most Excellent American Cotton, with a greenish Seed.

3. XYLON; *frve Gossypium, frutescens annum, folio vitis ampliori, quinquifido, Insulae Providentiae*. Pluk. Phyt. Annual Shrubby Cotton of the Island of Providence, with a large quinquifid Vine Leaf.

4. XYLON; *arboreum*. J. B. The Tree Cotton.

5. XYLON; *arboreum, flore flavo*. Tourn. Tree Cotton, with a yellow Flower.

6. XYLON; *arboreum, caule spinoso*. Tourn. Tree Cotton, with a thorny Stalk.

There are several other Varieties of this Plant in the warm Parts of the East and West Indies, where they grow in great Plenty, some of which have been observed by the Curious in Botany; but others have escaped their Notice; however, these being what I have observed growing in the European Gardens, I shall not trouble the Reader with an Enumeration of the other Varieties.

The first Sort here mention'd, is cultivated plentifully in Candy, Lemnos, Cyprus, Malta, Sicily and at Naples; as also between Jerusalem and Damascus, from whence the Cotton is brought annually into these Northern Parts of Europe. It is sown upon tilled Grounds in the Spring of the Year, and cut down and reaped in Harvest, as Corn with us; the Ground must be tilled and sown again the succeeding Year, and managed in such Sort, as we do the Tillage for Corn and other Grain: It is an annual Plant, perishing when it hath perfected its Fruit, as many others do.

This Cotton is the Wooll which encloses or wraps up the Seeds, and is contained in a kind of brown Husk or Seed-Vessel, growing upon this Shrub; for it is from this Sort, that the vast Quantities of Cotton are taken which furnish our Parts of the World: It is brought from the Islands, where the Natives take great Care of its Culture: There are several Sorts of Cotton sold, which chiefly differ according to the Countries from whence they come, and the various Preparations made of them; the first is the Cotton in the Wooll, that is to say, that which comes from the Shell, from which only we take the Seed; those Cottons come from Cyprus, Smyrna, &c. The second, is the Cotton in the Yarn, which comes from Damascus; the Jerusalem Cottons which are called Bazac's, are the best which are sold. The second and third Sorts are also Annual, these are cultivated in the West-Indies in great Plenty; but the fourth and fifth Sorts grow in Egypt; these abide many Years, and often arrive to be Trees of great Magnitude, from which the Inhabitants are annually furnish'd with great Quantities of Cotton. One of these Trees has a purplish, and the other a yellow Flower, which I believe is the only Difference between them.

The sixth Sort grows very plentifully both in the East and West-Indies, where it arrives to a prodigious Magnitude; the Inhabitants of those Countries hollow the Trunks of these Trees to make Canoes, for which they are chiefly valued. It is reported that in Cuba; in Columbus's first Voyage, was seen a Canoe made of a hollowed Trunk of this Tree, which was Ninety-five Palms long, and able to contain One hundred and Fifty Men. And others say, that there are Trees of this Sort so large as scarcely to be fathomed by sixteen Men, and so high, that an Arrow can scarce be shot to their Tops.

The Wooll growing upon these Trees, is of a dark Colour, and too short to spin, so that it is little valued; but sometimes the Inhabitants stuff Beds and Pillows with it, though it is accounted unwholesome to lie upon:

This

This is called by the Inhabitants of the *West-Indies*, *Silk Cotton*.

All these Sorts are preserved in the Gardens of those who are curious in collecting rare Plants. They are easily raised from Seeds, (which may be obtain'd fresh from the Places of their Growth); these must be sown upon a Hot-bed early in the *Spring*, and when the Plants come up, they must be transplanted out each into a separate small Pot, filled with light fresh Earth, and plunged into a moderate Hot-bed of Tanners Bark, observing to water and shade them until they have taken Root, after which they should have Air and Water in Proportion to the Warmth of the Season, and the Heat of the Bed in which they are placed: For if they are too much drawn, by keeping the Glasses close down in the Day-time, they will run up very weak and slender, so as not to be able to support themselves, and if they are too much exposed to the Air, they will not make any Progress in their Growth.

When the Plants are so far advanced, as to fill the Pots with their Roots, they should be shaken out and put into larger Pots, which should be filled with the same light fresh Earth, and again plunged into the Hot-bed and managed as before; thus from time to time as the Plants advance, they must be removed into larger Pots, and as the Warmth of the Season increases, so they should have a greater Share of Air; and when they are too tall to continue under the Glasses of the Hot-bed Frame, they must be removed into the Stove and placed in the Tan-bed, amongst other tender Exotick Trees and Shrubs; in which Place the annual Sorts will produce their Flowers in *Autumn*; but they rarely produce Pods in this Country.

The Tree Kinds must be continued in this Bark Stove all the *Winter*, and if they are placed with the *All-spice*, *Sea-side Grape*, and such other *West-Indian* Trees, observing to keep the Air of the House about ten Degrees above the temperate Heat mark'd on Mr. *Fowler's* Botanical Thermometers, they will thrive very well, provided they are often refreshed with Water.

The large *Silk Cotton* Tree is of quick Growth. I have raised some of these Plants more than seven Feet high in one Season, from Seeds, and had we Stoves capacious enough for this Plant, it would in a few Years, become a large Tree in this Country.

which is Bell-shap'd, cut into six Segments and naked, these are produced on long Spikes; the Ovary which is in the Center of the Flower, afterwards becomes a tricapsular Fruit as in the Aloe.

The Species are;

1. YUCCA; foliis Aloes. C. B. P. The common *Tucca*.
2. YUCCA; foliis filamentosis. Morifs. *Tucca* with Threads growing from the Leaves.
3. YUCCA; Arborea. The Tree *Tucca*.
4. YUCCA; Caroliniana, angustifolia, marginibus vix serratis. The Narrow-leav'd Carolina *Tucca*, with Leaves scarcely ferrated on the Edges.

The first of these Plants is pretty hardy, and when grown strong, will endure the Cold of our ordinary Winters in the open Air very well, provided it be planted on a dry Soil: This commonly produces its Flowers every Year, which grow very sparingly on the Stalks, and are less beautiful than those of the Tree Sort, which are produced in a long, close Spike, and make a very beautiful Appearance; but these do not flower oftener than once in four or five Years, which is always in *Autumn*, so that they never produce any Seeds in this Country.

The threaded Sort is not so common as the others in the *English* Gardens; but as it is a Native of *Virginia*, it might be easily procured in Plenty from thence. The *Carolina* Sort hath been raised of late Years from Seeds which came from thence, and is now pretty common in *England*; but the Plants are not as yet arrived to Maturity enough to produce Flowers in *England*; so that I cannot say how they differ from those of the other Sorts.

All these Plants are either propagated by Seeds, when obtained from Abroad, or else from Off-sets or Heads taken from the old Plants, after the Manner of *Aloes*.

When they are raised from Seeds, they should be sown in Pots filled with light fresh Earth, and plunged into a moderate Hot-bed, where the Plants will come up in five or six Weeks after, and when they are two or three Inches high, they should be transplanted each into a separate small Pot filled with light fresh Earth, and plunged into the Hot-bed, where the Plants should have Air and Water in Proportion to the Warmth of the Season, and the Bed in which they are placed.

In *July*, they should be inured by degrees to bear the open Air, into which they must be removed, to harden them before *Winter*, placing them in a well-sheltered Situation, where they may remain until the Beginning of *October*, when they must be removed into the Greenhouse, where they may be ranged amongst the harder Sorts of *Aloes*, and should be treated in the same Manner as hath been already directed for them, to which the Reader is desired to turn for further Instructions.

When these Plants have acquired Strength, they may be afterwards turned out into a warm Border, where they will endure the Cold of our ordinary Winters very well, especially

Y E

YEW TREE; vide *Taxus*.

YUCCA: The Indian *Yucca*; vulgô.

The Characters are;

It hath the Appearance of an Aloe, the Leaves ending in a sharp Point, but will grow in the Habit of a Tree; The Flower consists of one Leaf,

cially the two first Sorts; and, I believe, the other two Sorts will bear the Cold pretty well, after they are grown strong and woody in their Stems.

The Off-sets taken from the old Plants should be laid in a dry Place for a Week or ten Days before they are planted, that their Wounds may heal, otherwise they will be subject to rot with Moisture.

Z I

ZINZIBER; [*zingiber*,] Ginger.

The Characters are;

The Flower (for the most part) consists of five Leaves, which are shap'd somewhat like those of the Iris; these are produc'd in a Head or Club, each coming out of a separate leafy Scale: The Ovary afterwards becomes a triangular Fruit, having three Cells which contain the Seeds.

The Species are;

1. ZINZIBER; C. B. P. The common Ginger.

2. ZINZIBER; *Latifolium*; *Sylvestre*. H. L. Broad-leav'd wild Ginger, or Zierumbeth.

The first of these Plants is cultivated in the warm Parts of the *West-Indies* in great Plenty, from whence we are annually furnish'd with the dried Roots for Use. The second Sort is most common in the *East-Indies*, tho' it grows wild in some Parts of the *West-Indies*; there are small Quantities of this Root brought into *Europe* for medicinal Use, but it is never used in the Kitchen as the other.

These Plants are preserved as Curiosities in the Gardens of those who delight in rare Plants: They are both propagated by parting of their Roots; the best time for which is in the *Spring*, before they begin to shoot, when each large Shoot may be divided into several Parts, observing always to preserve two or three Eyes to each Piece: These should be planted into Pots filled with rich, light Earth, and plunged into a Hot-bed of Tanners Bark, where they must be frequently refresh'd with Water, and in hot Weather the Glasses should be rais'd with a Brick, to give them Air in proportion to the Warmth of the Season, and the Heat of the Bed in which they are placed; for when their Leaves are come up, if they are too much drawn, they will grow very tall and weak, and the Roots will make but very indifferent Progress. But when they have a due Proportion of Heat, Moisture, and free Air, their Roots will thrive so fast, as in one Season, from a small Head, to spread over a large Pot, and sometimes will produce Flowers in this Country.

But these Plants must be constantly kept in a Hot-bed of Tanners Bark, for they are too tender to endure the open Air in *England*, in the warmest Part of *Summer*; and in *Winter*

they must be placed in a Bark Stove; for altho' their Leaves do decay in *Autumn*, and their Roots seem to remain in an unactive State most part of the *Winter*; yet, if they are not preserved in a very warm Place during that Season, they will entirely rot, as I have more than once observed: Nor do these Roots abide the *Winter* so well when placed upon Boards in the warmest Stove, as when they are plunged in the Bark Bed, tho' they are preserved in the same Degree of Warmth; which I conceive to be owing to the Moisture of the Bark, which in Fermentation ascends, and entering the Holes at the Bottom of the Pots, affords an agreeable Nourishment to the Roots, preserving them always plump and full; whereas those in a dry Stove, do often shrink for want of Moisture, and so many times decay; for it is not very safe to give them much Water after their Leaves are decay'd, because they are very apt to rot with too much Moisture at that Season.

When their Leaves are decay'd, is the proper Time to take up these Roots; but those that are design'd to plant again, should not be disturb'd till the *Spring*, just before they begin to shoot; which, as was before observed, is the best Time to transplant them, because they soon after send forth their Fibres, which will preserve them from rotting.

ZIZIPHUS; the Jujube.

The Characters are;

The Flower consists of several Leaves, which are placed circularly, and do expand in Form of a Rose, out of whose Empalement rises the Pointal, which afterwards becomes an oblong, fleshy Fruit, shap'd like an Olive, including a hard Shell divided into two Cells, each containing an oblong Nut or Kernel.

The Species are;

1. ZIZIPHUS; *Dod.* The common manured Jujube.

2. ZIZIPHUS; *Sylvestris*. *Tourn.* The wild Jujube.

3. ZIZIPHUS; *quæ Jujube Americana, Spinosa, Loti Arboris foliis & facie, fructu rotundo parvo dulci.* Hort. Beaumont. Prickly American Jujube, with Leaves like the Nettle Tree, and small, round, sweet Fruit, commonly called in the *West-Indies*, Mangosteen.

4. ZIZIPHUS; *argenteo Zeylanica, spinis carens, Walambilla Zeylanensibus dicta.* P. B. P. Silver-leav'd Jujube of Ceylon without Spines, commonly called, Walambilla.

The first of these Plants is cultivated in the Gardens of *Italy*, and the South Parts of *France*, from whence the Fruit was formerly brought into *England* for medicinal Use; but of late Years it has been very little used in the Shops, so that there is rarely any of it brought over at present.

In those warm Countries they preserve the Fruit for the Table in the *Winter* Season, when few other Kinds are in Perfection, at which Time these, and *Services*, and some other Sorts, do furnish their Deserts.

The Fruit is somewhat like a small Plum, but it has not a great Share of Flesh upon the

Stone, but it having an agreeable Flavour, is by some Persons greatly esteem'd.

The second Sort grows wild in the Hedges in the South of *France*, *Italy*, and *Spain*, but in these colder Countries it is preserved in the Gardens of those who are curious in collecting of the various Kinds of Trees and Shrubs.

These Plants may be propagated by putting their Stones into Pots of fresh, light Earth, soon after their Fruits are ripe, and in *Winter* they should be placed under a common Hot-bed Frame, where they may be shelter'd from severe Frost: In the *Spring* these Pots should be plunged into a moderate Hot-bed, which will greatly facilitate the Growth of the Seeds; and when the Plants are come up, they should be inured to the open Air by Degrees, into which they must be removed in *June*, placing 'em near the Shelter of a Hedge, and in very dry Weather they must be frequently refresh'd with Water.

In this Situation they may remain until the Beginning of *October*, when they must be removed either into the Green-house, or placed under a Hot-bed Frame, where they may be defended from Frost, but should have as much free Air as possible in mild Weather.

During the *Winter* Season they should be now and then refresh'd with Water; but after their Leaves are fallen (as they always shed them in *Winter*), they must not be over-water'd, which would rot the tender Fibres of their Roots, and cause the Plants to decay.

In *March*, just before the Plants begin to shoot, they should be transplanted, each into a separate small Pot, filled with fresh, light Earth, and if they are plunged into a moderate Hot-bed, it will greatly promote their taking Root; but in *May* they must be inured to the open Air by Degrees, into which they should be soon after removed.

Thus these Plants should be manag'd while young, during which Time they are tender, but when they are three or four Years old,

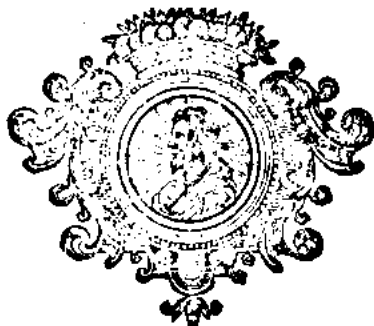
they may be planted in the full Ground where, if they have a dry Soil, and a warm Situation, they will endure the Cold of our ordinary *Winters* very well.

These Plants may be also propagated by Suckers, which the old ones do many times send forth from their Roots, but these are seldom so well rooted as those produced from Seeds, and do seldom make so good Plants, for which Reason they are but rarely propagated that Way.

The third Sort is very common in *Barbadoes*, *Jamaica*, and the other warm Parts of *America*, from whence I have several times received the Seeds, which do generally rise very freely on a Hot-bed; but the Plants being very tender, require the Help of a Bark-bed constantly, without which they will not make any Progress; and in *Winter* they must be placed in the Bark-Stove, where, if they are frequently refresh'd with Water, they will thrive extremely well. There are several Plants of this Kind in the Gardens of the Curious, but I have not observed any to produce Flowers as yet.

The fourth Sort was brought into *England* from some curious Garden in *Holland* many Years ago; this was rais'd in the Gardens of *Mynheer Van Beaumont*, from Seeds, which he receiv'd from *Ceylon*, and since hath been communicated to many curious Persons in *Holland* and *England*. There is no Way as yet found successful to propagate this Plant, but from Seeds, which being never produced in these cold Countries, and but rarely brought from Abroad, is the Reason it is not very common in the *European* Gardens at present.

This is preserved in Pots of light, fresh Earth, and placed in a Stove in *Winter*, where it may be kept in a moderate Warmth, and must be frequently refresh'd with Water, with which Culture the Plants will thrive very well; but I have not seen 'em produce any Flowers as yet in *England*, though there are several pretty old Trees in the Gardens at *Hampton-Court*.





A N

I N D E X

Of the THINGS Treated of in the

Gardeners Dictionary.

A

- A** BELE-TREE, *vide*
 Populus
 Abies
 Abrotanum
 Abrotanum Fœmina, *vide*
 Santolina
 Absinthium
 Abutilon
 Acacia
 Acacia Germanorum, *vide*
 Prunus Sylvestris
 Acacia Virginiana, *vide* Pseu-
 do-Acacia
 Acajou
 Acanaceous Plants
 Acanthus
 Acaulos
 Acer
 Acetosa
 Acetofella, *vide* Oxys
 Acinos
 Aconitum
 Aconitum hyemale
 Acriviola
 Adhatoda
 Adiantum
 Adonidis Horti
 Æschynomene, *vide* Mimosa
 Æschynomenous Plants
 Æther
 African Marygolds, *vide* Ta-
 getes
 Ageratum
 Agnus Castus, *vide* Vitex
 Agrimonia
 Agrimony, *vide* Agrimonia
 Hemp Agrimony, *vide* Eupa-
 torium
 Water Hemp Agrimony, *vide*
 Bidens
 Air
 Ala
 Alæ
 Alaternoides
 Alaternus
 Alcea
 Alchymilla
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 Berry-bearing Alder, *vide*
 Frangula
 Alefander, *vide* Smyrnum
 Alexander, *vide* Smyrnum
 All-heal, *vide* Pastinaca
 Alleluja, *vide* Oxys
 Aliaria
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 Almond-tree, *vide* Amygda-
 lus
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 Alkekengi
 Alnus Nigra Baccifera, *vide*
 Frangula
 Aloe
 Water Aloe, *vide* Aloides
 Aloides
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 Amaranth, *vide* Amaranthus
 Amaranthus
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 Liquid Amber, *vide* Styrax
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 num
 Amoris Pomum, *vide* Lyco-
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 Anana
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 Anisum
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- Anthora, *vide* Aconitum
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 Custard-apple, *vide* Anona
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 Paradise-apple, *vide* Malus
 Star-apple, *vide* Anona
 Sowre-apple, *vide* Anona
 Water-apple, *vide* Anona
 Fig-apple, *vide* Malus
 Apples of Love, *vide* Lycopersicon
 Mad-apples, *vide* Melongena
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 Aquifolium
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 Arboreous
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 Arcuation
 Area
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 Aria Theophrasti, *vide* Cratægus
 Arisarum
 Aristolochia
 Armeniaca
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 Jerusalem Artichoke, *vide* Corona Solis
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 Arse-smart, *vide* Persicaria
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 Asarum
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 Asparagus
 Aspen-tree, *vide* Populus
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 Asphodelus
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 After
 Afteriscus
 Astragalus
 Avens, *vide* Caryophyllata
 Avenues
 August
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 Auricula Muris
 Auricula Urli Myconi, *vide* Verbascum
 Azedarach
 Azerole, *vide* Mespilus.
- ## B
- B**acca
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 Bacciferous
 Balustia, *vide* Punica
 Balaustium
 Ballote
 Balm, *vide* Melissa
 Molucca Balm, *vide* Molucca
 Turkey Balm, *vide* Moldavica
 Balfam-apple, *vide* Balfamina
 Male Balfam-apple, *vide* Momordica
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 Bamia Moschata, *vide* Ketmia.
 Banana, *vide* Musa
 Bane-berries, *vide* Christophoriana
 Barba Capra, *vide* Ulmaria
 Barba Jovis
 Barbadoes Flower-fence, *vide* Poinciana
 Barbadoes Cherry, *vide* Malpighia
 Barberry-tree, *vide* Berberis
 African Barberry, *vide* Eonymus
 Barley, *vide* Hordeum
 Naked Barley, *vide* Triticum
 Barometer
 Barren-wort, *vide* Epimedium
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 Stone Basil, or Wild Basil, *vide* Acinos
 Basilicum, *vide* Ocimum
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 Bean-trefoil, *vide* Cytisus
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 Beech-tree, *vide* Fagus
 Beet, *vide* Beta
 Belladonna
 Bellis
 Bell-flower, *vide* Campanula
 Bellis Major, *vide* Leucanthemum
 Hair Bells, *vide* Hyacinthus
 Benjamin-tree, *vide* Arbor Virginiana, &c.
 Herb Bennet, *vide* Caryophyllata
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 Betonica
 Betonica Pauli, *vide* Veronica
 Betonica Aquatica, *vide* Scrophularia
 Betony, *vide* Betonica
 Star of Bethlehem, *vide* Ornithogalum
 Betula
 Bidens
 Bifolium
 Bindweed, *vide* Convolvulus, Smilax, Quamoclit
 Bilberry Bush, *vide* Vitis
 Idæa
 Birch-tree, *vide* Betula
 Birds-eye, *vide* Adonis
 Birds-foot Trefoil, *vide* Lotus
 Birds-foot, *vide* Ornithopodium
 Birthwort, *vide* Aristolochia
 Bishops-weed, *vide* Ammi
 Bilingual, *vide* Ruscus
 Bivalvular
 Black-thorn, *vide* Prunus
 Bladder-nut, *vide* Staphylo-dendron
 Blattaria
 Blights
 Blood Flower, *vide* Hæmanthus
 Blood-wort, *vide* Lapathum
 Blue-bottle, *vide* Cyanus
 Bonus Henricus, *vide* Chenopodium
 Boor-cole, *vide* Brassica
 Borrage, *vide* Borrago
 Borrago
 Bosquets
 Botrys, *vide* Chenopodium
 Box-tree, *vide* Buxus
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 Brank Urfin, *vide* Acanthus
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I N D E X.

St. John's Bread, *vide* Siliqua
 Brittol Flower, *vide* Lychnis
 Brocoli, *vide* Brassica
 Brook-lime, *vide* Becabunga
 Spanish Broom, *vide* Spartium
 Green Broom, *vide* Cytisogenista
 Broom, *vide* Genista, Scoparia
 Brunella
 Bruscus, *vide* Ruscus
 Bryony, *vide* Brionia
 Bucks-horn, *vide* Coronopus
 Buck-wheat, *vide* Fagopyrum
 Bugloss, *vide* Buglossum
 Viper's Bugloss, *vide* Echium
 Bugle, *vide* Bugula
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 Bulbocastanum
 Bulbocodium
 Bullace-tree, *vide* Prunus
 Buphthalmum
 Bupleuroides
 Beupleurum
 Burdock, *vide* Lapathum
 Burnet, *vide* Pimpinella
 Purfa Pastoris
 Butcher's Broom, *vide* Ruscus
 Butter Burr, *vide* Petasitis
 Butomus
 Buxus

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C Abbage, *vide* Brassica
 Sea Cabbage, *vide* Crambe
 Cabinet
 Cajou, *vide* Acajou
 Cashew Nut, *vide* Acajou
 Calabash-tree, *vide* Cucurbitifera Arbor
 Calamint, *vide* Calamintha
 Calamintha
 Water Calamint, *vide* Mentha
 Caltha
 Caltha Palustris, *vide* Populus
 Calve's Snout, *vide* Antirrhinum
 Calix
 Cammock, *vide* Anonis
 Camomile, *vide* Chamæmelum
 Campaniform
 Campanula
 Camphire, *vide* Camphora
 Camphora
 Campion, *vide* Lychnis
 Candleberry-tree, *vide* Gale
 Cannabis
 Canna Indica, *vide* Cannacorus
 Candy Carrot, *vide* Myrrhis
 Canterbury Bells, *vide* Campanula
 Capers, *vide* Capparis.

Capillaments
 Capnorchis
 Bean Caper, *vide* Fabago
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 Capitulum
 Capnoides
 Caprifolium
 Capsicum
 Capsulate Pods
 Caracalla, *vide* Phaseolus
 Caraway, *vide* Carui
 Cardamindum, *vide* Acriviola
 Cardamine
 Cardiaca
 Cardinals Flower, *vide* Ranunculum
 Carduus
 Carduus Benedictus, *vide* Cnicus
 Carduus Fullonum, *vide* Difaculus
 Carnation, *vide* Caryophyllus
 Spanish Carnation, *vide* Poinciana
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 Carrot, *vide* Daucus
 Deadly Carrot, *vide* Thapsia
 Candy Carrot, *vide* Myrrhis
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 Caryophyllata
 Caryophyllus
 Cassia
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 Cassine
 Cassioberry Bush, *vide* Cassine
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 Castanea Equina, *vide* Hippocastanum
 Catanance
 Cataputia Major, *vide* Ricinus
 Cataputia Minor, *vide* Tithymalus
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 Cats-foot, *vide* Elichrysum
 Cat-mint, *vide* Cataria.
 Catkins
 Catulus
 Caucalis
 Cauliferous
 Caulis
 Cedar of Bermudas, *vide* Juniperus
 Cedar of Carolina, *vide* Juniperus
 Cedar of Virginia, *vide* Juniperus
 Cedar of Lebanon, *vide* Cedrus Libani
 Cedrus Baccifera
 Celandine, *vide* Chelidonium
 Greater Celandine, *vide* Chelidonium Majus
 Lesser Celandine, *vide* Chelidonium Minus

Celastrus, *vide* Alaternus
 Celery, *vide* Apium
 Cells of Plants
 Cellis
 Great Centaury, *vide* Centaury Majus
 Lesser Centaury, *vide* Centaury Minus
 Centinodium
 Cerasus
 Ceratium, *vide* Siliqua Edulis
 Cerefolium, *vide* Chæresolium
 Cerinthe
 Ceterach, *vide* Asplenium
 Chærophylum
 Chamæcistus, *vide* Helianthemum
 Chamæclema
 Chamæcyparissus, *vide* Santolina
 Chamædaphne, *vide* Ruscus
 Chamædryas
 Chamælea, *vide* Thymelea
 Chamælea Tricoccus
 Chamæmelum
 Chamæmespilus, *vide* Mespilus
 Chamæmorus
 Chamenerion
 Chamæpitys
 Chamæriphe, *vide* Palma
 Chamærubus, *vide* Rubus
 Chamæscye, *vide* Tithymalus
 Chaste-tree, *vide* Vitex
 Cheese Runnet, *vide* Gallium
 Chelidonium Majus
 Chelidonium Minus
 Chelone
 Chenopodia-Morus
 Chenopodium
 Cherry-tree, *vide* Cerasus
 Cherry Laurel, *vide* Lauro-Cerasus
 Cherry Bay, *vide* Lauro-Cerasus
 Barbadoes Cherry, *vide* Malpighia
 Winter Cherry, *vide* Alkekengi
 Chervil, *vide* Chærophylum
 Great Chervil, *vide* Myrrhis
 Chesnut, *vide* Castanea
 Horse Chesnut, *vide* Hippocastanum
 Scarlet flowering Horse Chesnut, *vide* Pavia
 Chiches, *vide* Cicer
 Chickling Vetch, *vide* Clymenum & Lathyrus
 Chives
 Chondrilla
 Christmas Flower, *vide* Helleborus
 Christs-Thorn, *vide* Paliurus
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 Herb Christopher, *vide* Christophoriana

Chrysan-

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- Chrysanthemoides Oitcospermon
 Hard-seeded Chrysanthemum
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 Chrysanthemum
 Chrysolipnum
 Cicer
 Cichorium
 Cicuta
 Cicutaria
 Cinara
 Cineraria, *vide* Jacobæa
 Cinqufoil, *vide* Quinquifolium
 Ballard Cinqufoil } Pentaphyl-
 Shrub Cinqufoil } loides
 Circeæ
 Circulation
 Cirri
 Circium
 Cistus
 Dwarf Cistus, *vide* Helianthemum
 Citrioides
 Citron-tree, *vide* Citreum
 Citrul, *vide* Pepo
 Clary, *vide* Horminum & Sclearea
 Clavicle
 Clematitis
 Climate
 Climber, *vide* Clematitis
 Upright wild Climber, *vide* Clematitis
 Clinopodium
 Clivers, *vide* Aparine
 Clymenum
 Cnicus
 Cloud-berries, *vide* Chamæmorus
 Coast-mary, *vide* Balsamita
 Cobnut-tree, *vide* Corylus
 Coccigria, *vide* Cotinus coriaria
 Cock's-Head, *vide* Onobrychis
 Cocos, *vide* Palma Nucifera
 Codlin-Tree, *vide* Malus
 Codlins and Cream, *vide* Chamænerion
 Coffee-tree, *vide* Jasminum
 Colchicum
 Cold
 Coleworts, *vide* Brassica
 Colliflower, *vide* Brassica
 Colocynthis
 Coloquintida, *vide* Colocynthis
 Colts-foot, *vide* Tussilago
 Columbine, *vide* Aquilegia
 Colutea
 Podded Colutea Cretica, *vide* Coronilla
 Colutea Scorpiodes, *vide* E-merus
 Coma Aurea
 Commelina
 Commeline, *vide* Commelina
 Comfrey, *vide* Symphytum
 Compartiments
 Composts
 Compound Flowers
 Cone
 Coniferous Trees
 Conservatory, *vide* Greenhouse
 Consolida Major, *vide* Symphytum
 Consolida Media, *vide* Bugula
 Consolida Minima, *vide* Bellis
 Consolida Regalis, *vide* Delphinium
 Conval Lily, *vide* Lilium
 Convallium
 Convolvulus
 The Coral-tree, *vide* Corallo-dendron
 Corchorus
 Coriander, *vide* Coriandrum
 Corindum
 Cork-tree, *vide* Suber
 Corn-flag, *vide* Gladiolus
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 Corn-bottle, *vide* Cyanus
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 Corn-salld, *vide* Valerianella
 Cornel-tree, *vide* Cornus
 Cornus
 Cornelian Cherry, *vide* Cornus
 Corona Imperialis
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 Coronilla
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 Cortufa
 Corylus
 Corymbiferous Plants
 Corymbus
 Cotinus Coriara
 Cotonea Malus, *vide* Cydonia
 Cotoneaster, *vide* Mespilus
 Cotton Plant, *vide* Xylon
 Cotula foetida, *vide* Chamæmelum foetidum
 Cotton-weed, *vide* Gnaphalium
 Cotyledon
 Cowslip, *vide* Primula Veris
 Cows Lungwort, *vide* Verbascum
 Crab tree, *vide* Malus
 Crambe
 Cranes-bill, *vide* Geranium
 Crassula, *vide* Anacampseros
 Cratægus
 Cress, *vide* Nasturtium
 Garden-cresses, *vide* Nasturtium
 Water-cresses, *vide* Sisymbrium
 Indian-cresses, *vide* Acriviola
 Winter-cress, *vide* Sisymbrium & Barbarea
 Crithmum
 Crista Pavonis, *vide* Poinciana
 Crocus
 Cross-wort, *vide* Crucata
 Crotolaria
 Crow-foot, *vide* Ranunculus
 Crown Imperial, *vide* Corona Imperialis
 Crucata
 Cuccubalus
 Cucullate Plants
 Cuckow Pint, *vide* Arum
 Cucumis
 Cucumber, *vide* Cucumis
 Wild Cucumber, *vide* Elaterium
 Cucurbita
 Cucurbitifera Arbor
 Cud-weed, *vide* Gnaphalium
 Culmiferous Plants
 Cummin, *vide* Cuminum
 Wild Cummin, *vide* Cuminoides
 Cuminoides
 Cuminum
 Currant-tree, *vide* Ribes
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 Custard-apple, *vide* Anona
 Cyanus
 Cyclamen
 Cydonia
 Cynoglossum
 Cypress tree, *vide* Cypressus
 Summer Cypress, *vide* Chenopodium
 Cytticapnos
 Cytiso-genista
 Cytifus

D

- D** Affodil, *vide* Narcissus
 Lily Daffodil, *vide* Lilio
 Narcissus
 Daifey, *vide* Bellis
 Ox-eye Daifey, *vide* Leucanthemum
 Dames Violet, *vide* Hesperis
 Dandelion, *vide* Dens Leonis
 Danewort, *vide* Sambucus
 Date-tree, *vide* Palma
 Indian Date-tree, *vide* Guaiacana
 Daucus
 Daucus Creticus, *vide* Myrrhis
 Day-lily, *vide* Liliastrum
 Dead-nettle, *vide* Lamium
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 Devil-in-a-bush, *vide* Nigella
 Decortication
 Delphinium
 Dens Canis
 Dens Leonis
 Dentaria
 Dew
 Diapentia, *vide* Sanicula
 Dictamnus albus, *vide* Fraxinella
 Dictamnus
 Dictamnus Creticus
 Digitalis
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 Dittany, *vide* Dictamnus
 Bastard Dittany, *vide* Pseudodictamnus
 Dock, *vide* Lapathum
 Dog's bane, *vide* Apocynum
 Dog-berry-tree, *vide* Cornus
 Dog-wood, *vide* Cornus
 Dogs-tooth, *vide* Dens Canis
 Doria
 Doronicum
 Doriferous
 Dorycnium
 Draco Herba
 Draco Arbor, *vide* Palma
 Dracunculoides
 Dracunculus
 Dracunculus Pratenfis, *vide* Ptarmica
 Dragon, *vide* Dracunculus
 Dragon-wort, *vide* Draco Herba
 Bastard Dragon, *vide* Dracunculoides
 Drop-wort, *vide* Filipendula
 Water Drop-wort, *vide* Oenanthe
 Droffion, *vide* Ros Solis
 Duck's foot, *vide* Anapodophyllon
 Duck's-meat, *vide* Lens Pa-lustris
 Dulcamara, *vide* Solanum
 Dungs
 Dwarf Laurel, *vide* Thymelia
 Dwarf Trees
 Dyers Weed, *vide* Luteola

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B Ears Ear, *vide* Auricula
 Urfi
 Earth
 Peas Earth-nut, *vide* Lathyrus
 Earwigs
 Ebulus five Sambucus humilis
 Echinate Seeds
 Echynomelocactus, *vide* Melocactus
 Echinophora
 Echinopus
 Echinus
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 Edera Quinquifolia, *vide* Vitis
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 Efflorescence
 Egerminate
 Elaterium
 Elatine, *vide* Linaria
 Elichrysum
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 Marsh Elder, *vide* Opulus
 Elm, *vide* Ulmus

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 Empetrum
 Emuscation
 Enchanters Nightshade, *vide* Circea
 Endive, *vide* Cichorium
 Enucleation
 Enula Campana, *vide* Helanium
 Ephemerum
 Epimedium
 Epiphylospermous Plants
 Equinoctial
 Equinoxes
 Equisetum
 Eranthemum, *vide* Adonis
 Erica
 Erica Baccifera, *vide* Empe-trum
 Erigeron, *vide* Senecio
 Eruca
 Erucago
 Ervum
 Eryngo, *vide* Eryngium
 Eryngium
 Erysimum
 Eschynomenous Plants
 Esculent Plants
 Espaliers
 Eternal Flowers, *vide* Xeranthemum, Elichrysum, Amaranthoides
 Everlasting Pea, *vide* Lathyrus
 Everlasting Flower, *vide* Amaranthoides, Xeranthemum, Elichrysum
 Euonymus
 Eupatorium
 Euphorbium
 Excortication
 Exoticks

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F Aba
 Faba Aegyptiaca, *vide* Arum Aegytiacum
 Faba Crassa, *vide* Anacampseros
 Fabago
 Fagopyrum
 Fagus
 Featherfew } *vide* Matricaria
 Feaverfew }
 February
 Fellwort, *vide* Gentiana
 Fennel, *vide* Foeniculum
 Fennel Flower, *vide* Nigella
 Hogs-fennel, *vide* Peucedanum
 Fennel-giant, *vide* Ferula
 Fenugreek, *vide* Foenum Græcum
 Fern, *vide* Filix
 Sweet Fern, *vide* Myrrhis
 Ferrum Equinum
 Ferula
 Ficoides
 Ficus

Ficus Indica, *vide* Opuntia
 Fig-tree, *vide* Ficus
 Fig Marygold, *vide* Ficoides
 Indian Fig, *vide* Opuntia
 Fig-wort, *vide* Scrophularia
 Filago, *vide* Gnaphalium
 Filbert, *vide* Corylus
 Filipendula
 Filius ante Patrem
 Film
 Fimbriated
 Fire
 Firr-Tree, *vide* Abies
 Fistular Flowers
 Flammula Jovis, *vide* Clematitidis
 Flax, *vide* Linum
 Toad-flax, *vide* Linaria
 Flea-bane, *vide* Conyza
 Flea-wort, *vide* Psyllium
 Flesh
 Flix-weed, *vide* Erysimum
 Floriferous
 Florist
 Florulent
 Flos Africanus, *vide* Tagetes
 Flos Passionis, *vide* Grana-dilla
 Flos Solis, *vide* Corona Solis
 Flos Trinitatis, *vide* Viola
 Flower
 Flower-de-luce, *vide* Iris & Xiphion
 Eternal Flower } Xeranthemum
 Everlasting Flower }
 Flower-fence, *vide* Poinciana
 Fluellin, *vide* Veronica
 Catch-fly, *vide* Lychnis
 Foeniculum
 Foenum Burgundiacum, *vide* Medica Sativa
 Foenum Græcum
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 Foot-stalk
 Fools-stones, *vide* Orchis
 Fountains
 Fox-glove, *vide* Digitalis
 Fox-tail, *vide* Alopecuros
 Fragaria
 Frangula
 Fraxinella
 Fraxinus
 French Marygolds, *vide* Tagetes
 Freezing
 Friars Cowl, *vide* Arisarum
 Fritillaria crassa, *vide* Asclepias
 Cock's-comb Fritillary, *vide* Asclepias
 Fructiferous
 Fructus
 Fruit
 Fruits preserving, *vide* Pyrus
 Frumentaceous
 Frumentum
 Frumentum Indicum, *vide* Mayz
 Frutex

Frutex

I N D E X.

Frutex Pavonius, *vide* Poin-
ciana
Fumaria
Fumitory, *vide* Fumaria
Bladder Fumitory, *vide* Cap-
noides
Indian bulbous-rooted Fumi-
tory, *vide* Capnorchis
Furz, *vide* Genista

G

G Ale
Galega
Galeopsis
Galleries
Gallium
Gardens
Garlick, *vide* Allium
Wild Garlick, *vide* Moly
Gatten-tree, *vide* Cornus
Gelder Rose, *vide* Opulus
Generation of Plants
Genista Juncea
Genista Spinosa
Gentian, *vide* Gentiana
Gentianella, *vide* Gentiana
Geranium
Germander, *vide* Chamædry-
Water Germander, *vide* Scor-
dium
Tree Germander, *vide* Teu-
crium
Geum
Gilder Rose, *vide* Opulus
Gill-go-by-the-ground, *vide*
Chamæclema
Gilliflower, *vide* Caryophyllus
Stock-gilliflower, *vide* Leu-
coium
Queen's Gilliflower, *vide* Hef-
peris
Ginger, *vide* Zinziber
Gingidium, *vide* Vifnaga
Glade
Gladiolus
Water Gladiole, *vide* Buto-
mus
Glastenbury Thorn, *vide* Mef-
pilus
Glandiferous Trees
Glandulous Roots
Glans
Glass-wort, *vide* Kali
Glaucium
Globe-flower, *vide* Helleboro-
ranunculus; *also* Cyanus
Globe-thistle, *vide* Echinopus
Glycyrrhiza
Gnaphalium
Goats-Rue, *vide* Galega
Goats-Beard, *vide* Tragopo-
gon
Goats-Thorn, *vide* Traga-
cantha
Goldelocks, *vide* Coma aurea
Golden-Rod, *vide* Virga au-
rea

Goose-foot, *vide* Chenopodi-
um
Goose-grass, *vide* Aparine
Gooseberry, *vide* Grossularia
Gossipium, *vide* Xylon
Gors, *vide* Genista Spinosa
Gourd, *vide* Cucurbita
Bitter Gourd, *vide* Colloquin-
tida
Grafting
Oily Grain, *vide* Sesamum
Granadilla
Grape, *vide* Vitis
Grape Hyacinth, *vide* Mus-
cari
Grape-flower, *vide* Muscari
Grass Vetch, *vide* Nissolia
Vipers-Grass, *vide* Scorzo-
nera
Gravel
Gravity
Greenhouse
Gromil } *vide* Lithosper-
Gromwell } mum
Grossularia
Ground Ivy, *vide* Chamæcle-
ma
Ground Pine, *vide* Chamæ-
pytis
Groundsel, *vide* Senecio
Guajacana
Guaiacum
Guava
Guidonia
Gum Succory, *vide* Chon-
drilla

H

H Aemanthus
Halicacabum, *vide* Al-
kekengi
Halicacabus Peregrina, *vide*
Corindum
Halimus, *vide* Atriplex
Hard-beam, *vide* Carpinus
Harmala
Hair-bells, *vide* Hyacinthus
Hares-ear, *vide* Bupleurum
Harts-horn, *vide* Coronopus
Harts-tongue, *vide* Lingua
Cervina
Hawk-weed, *vide* Hieracium
Hedynois
Hawthorn, *vide* Mespilus
Hazel, *vide* Corylus
Heath, *vide* Erica
Black-berried Heath, *vide*
Empetrum
Hedera
Hedera terrestris, *vide* Cha-
mæcissus
Hedges
Hedge Mustard, *vide* Erysi-
mum
Hedynois
Hedysarum
Helianthemum

Heliotropium
Hellebore, *vide* Helleborus
Bastard Hellebore, *vide* Hel-
leborus
White Hellebore, *vide* Vera-
trum
Helleborus
Helleborus Albus, *vide* Vera-
trum
Helmet Flower, *vide* Cassida
Hemerocallis, *vide* Liliun
Hemlock, *vide* Cicuta
Bastard Hemlock, *vide* Cicu-
taria
Hemp, *vide* Cannabis
Hemp Agrimony, *vide* Bidens
Henbane, *vide* Hyoscyamus
Hepatica
Hepatorium, *vide* Eupatori-
um
Heptaphyllum
Herba Gerardi, *vide* Angelica
sylvestris minor
Herbalist
Herbarist
Herba Paris
Herbiferous
Herbivorous
Herbosc
Herbosity
Herbulent
Hercules All-heal, *vide* Paffi-
naca
Hermannia
Hermodactilus, *vide* Colchi-
cum
Herniaria
Hesperis
Hickery, *vide* Juglans
Hieracium
Hig-taper } *vide* Verbaf-
High-taper } cum
Hills
Hippocastanum
Hippolapathum, *vide* Lapa-
thum
Hippocelinum, *vide* Smyrni-
um
Hirundaria, *vide* Asclepias
Hogs Fennel, *vide* Peuced-
num
Hollow-root, *vide* Fumaria
Hollyhocks, *vide* Malva Ro-
sea
Holly-tree, *vide* Aquifolium
Knee Holly, *vide* Roscus
Homogeneal
Honey-suckle, *vide* Caprifo-
lium
Upright Honeyfuckle, *vide*
Chamæcraus
Trumpet Honeyfuckle, *vide*
Periclymenum
French Honeyfuckle, *vide* He-
dysarum
Honeywort, *vide* Cerinthe
Honey-flower, *vide* Melian-
thus
Honesty, *vide* Lunaria
Hops,

I N D E X.

Hops, *vide* *Lupulus*
 Hordeum
 Horizontal Shelters
 Horminum
 Hornbeam, *vide* *Carpinus*
 Horned-poppy, *vide* *Glaucium*
 Horse-chestnut, *vide* *Hippocastanum*
 Flowering Horse-chestnut, *vide* *Pavia*
 Horse-dung
 Horse-mint, *vide* *Mentastrum*
 Horse-radish, *vide* *Choclearia*
 Horsetail, *vide* *Equisetum*
 Horehound
 Water Horehound, *vide* *Lycopus*
 Bafe Horehound, *vide* *Stachys*
 Bastard Horehound, *vide* *Marubiastrum*
 Stinking Horehound, *vide* *Ballore*
 Hose-in-hose, *vide* *Primula veris*
 Horns and Hedge-hog, *vide* *Medica*
 Hot-beds
 Houghing or Hoeing
 Hounds-tongue, *vide* *Cynoglossum*
 Houseleek, *vide* *Sedum*
 Humble Plant, *vide* *Mimosa*
 Hyacinth, *vide* *Hyacinthus*
 Hyacinthus Tuberosus
 Grape Hyacinth, *vide* *Muscari*
 Hydrocotyle
 Hydrolapathum, *vide* *Lapathum*
 Hydropiper
 Hydrostaticks
 Hygrometer
 Hyoscyamus
 Hypericum
 Hypericum Frutex, *vide* *Spiraea*
 Hypophyllospermous
 Hyssop, *vide* *Hyssopus*

I

J Acea
 Jacinth, *vide* *Hyacinth*
 Jack-by-the-Hedge, *vide* *Al-laria*
 Jacobæa
 Jacob's Ladder, *vide* *Polemonium*
 Jalapa
 January
 Jasmin, *vide* *Jasminum*
 Persian Jasmin, *vide* *Lilac*
 Scarlet Jasmin, *vide* *Bignonia*
 Iberis, *vide* *Lepidium*
 Ibiscus, *vide* *Althæa*
 Ice

Jerusalem Sage, *vide* *Phlomis*
 Jesuits Bark-tree, *vide* *Agerratum*
 Jet d'Eau
 Ilex
 L'Immortal, *vide* *Amaranthoides*
 Indian Wheat, *vide* *Mayz*
 Indigo Plant, *vide* *Anil*
 Intybus
 Job's Tears, *vide* *Lachryma Jobi*
 St. John's Bread, *vide* *Siliqua*
 Sweet John, *vide* *Caryophyllus Barbatus*
 St. John's-wort, *vide* *Hypericum*
 Jonquil, *vide* *Narcissus*
 Iris
 Iris Bulbosa, *vide* *Xiphium*
 Iris Persica, *vide* *um*
 Iris Uvaria, *vide* *Aloe Africana*, &c.
 Iron-wort, *vide* *Sideritis*
 Isatis
 Judaica Arbor, *vide* *Silquastrum*
 Judas-tree, *vide* *Silquastrum*
 Jujube, *vide* *Ziziphus*
 Julianus, *vide* *Hesperis*
 July-flower, *vide* *Caryophyllus*
 June
 Juniper, *vide* *Juniperus*
 Jupiter's Beard, *vide* *Barba Jovis*
 Ivy-tree, *vide* *Hedera*
 Ground-Ivy, *vide* *Chamæclama*

K

K Ali
 Ketmia
 Kidney-Beans, *vide* *Phaseolus*
 Kidney-Bean-tree, *vide* *Phaseoloides*
 Kidney-wort, *vide* *Geum*
 King's-spear, *vide* *Asphodelus*
 Knapweed, *vide* *Jacea*
 Knee Holly, *vide* *Ruscus*
 Knot-berries, *vide* *Chamæmoris*
 Knot-grass, *vide* *Centinodium*
 Polygonum

L

L Abiate Flowers
 Lablab, *vide* *Phaseolus*
 Labrum Veneris, *vide* *Dip-facus*
 Labrusca, *vide* *Vitis*

Laburnum, *vide* *Cytisus*
 Labyrinth
 Lachryma Jobi
 Lactiferous Plants
 Lactuca
 Lactuca Agnini, *vide* *Valerianella*
 Ladies Bed Straw, *vide* *Galium*
 Lady's Smock, *vide* *Cardamine*
 Lady's Slipper, *vide* *Helleborine*
 Lagopus, *vide* *Trifolium*
 Lake-weed, *vide* *Perficaria*
 Laminated
 Lamium
 Lampfana
 Lanigerous
 Lanuginous
 Lapathum
 Larch-tree, *vide* *Larix*
 Larix
 Larkspur, *vide* *Delphinium*
 Laser-wort, *vide* *Laserpitium*
 Lathyrus
 Latifolious
 Lavatera
 Lavender, *vide* *Lavendula*
 Sea Lavender, *vide* *Limonium*
 Lavender Cotton, *vide* *Santolina*
 French Lavender, *vide* *Stæchas*
 Laureola, *vide* *Thymelea*
 Laureocerasus
 Laurel, *vide* *Laurus*
 Alexandrian Laurel, *vide* *Ruscus*
 Dwarf Laurel, *vide* *Thymelea*
 Laurel Bay, *vide* *Laurocerasus*
 Laurus
 Laurustinus, *vide* *Tinus*
 Lawn
 Layers
 Laying of Trees
 Lead-wort, *vide* *Plumbago*
 Leaves
 Leeks, *vide* *Porrum*
 Legumes
 Leguminous
 Lemon-tree, *vide* *Limon*
 Lens
 Lens Palustris
 Lentiscus
 Leontopetalon
 Leontopodium, *vide* *Plantago*
 Leonurus
 Leopards-bane, *vide* *Doronicum*
 Lettuce, *vide* *Lactuca*
 Lambs Lettuce, *vide* *Valerianella*
 Leucoium
 Level
 Levity

Light

I N D E X.

- Light
 Lignum Vitæ, *vide* Guajacum
 Ligusticum
 Ligustrum
 Lily, *vide* Liliū
 Lilio Aphodelus, *vide* Aphodel, or Day Lily
 Lilio Fritillaria, *vide* Fritillaria
 Lily Daffodil, *vide* Lilio Narcissus
 May Lily, *vide* Liliū Convallium
 Liliū Persicum, *vide* Fritillaria
 Liliū Superbum, *vide* Methonica
 Water Lily, *vide* Nymphaea
 Lime-tree, *vide* Tilia
 Limon
 Limonium
 Linaria
 Lingua Cervina
 Linum
 Linum Umbilicatum, *vide* Omphalodes
 Lion's-foot, *vide* Leontopodium
 Candy Lion's-foot, *vide* Catantane
 Liquid Amber, *vide* Styrax
 Liquorice, *vide* Glycyrrhiza
 Liquorice Vetch, *vide* Abrus
 Lithospermum
 Live-ever, *vide* Anacampeiros
 Noble Liver-wort, *vide* Hepatica
 Loam
 Lobus Echinatus
 Locker Goulons, *vide* Helleboro Ranunculus
 Loculaments
 Lonchitis
 Longitudinal Vessels
 London Pride, *vide* Geum
 Lopping
 Lose-strife, *vide* Chamænerion
 Spiked Lose strife, *vide* Salicaria
 Lote-tree, *vide* Celtis
 Bastard Lote-tree, *vide* Guajacana
 Love-apple, *vide* Lycopersicon
 True Love, *vide* Herba Paris
 Lovage, *vide* Ligusticum
 La Lucern, *vide* Medica
 Lunaria
 Lung-wort, *vide* Pulmonaria
 Cows Lung-wort, *vide* Verbascum
 Lupine, *vide* Lupinus
 Lupulus
 Luteola
 Lychnidea
 Lychnis
 Lycopersicon
 Lycopus
 Lyfimachia Galericulata, *vide* Cassida
 Lyfimachia non Papposa, *vide* Onagra
 Lyfimachia Siliquosa, *vide* Chamænerion
- M
- M** Acaleb
 Maddar, *vide* Rubia Tinctorum
 Mad-apple, *vide* Melongena
 Mahaleb, *vide* Cerasus
 Maiden-hair, *vide* Adiantum
 White Maiden-hair, *vide* Ruta Muraria
 Majorana
 Malabar Nut, *vide* Adhatoda
 Mala Æthiopica, *vide* Lycopersicon
 Mala Armeniaca, *vide* Armeniaca
 Mala Cotonea, *vide* Cydonia
 Mala Infana, *vide* Melongena
 Malacoides
 Male Balsam-apple, *vide* Momordica
 Mallow, *vide* Malva
 Mallow-tree, *vide* Althæa
 Marsh-mallow, *vide* Althæa
 Jews Mallow, *vide* Corchorus
 Rose-mallow, *vide* Malva Rosea
 Malpighia
 Malt Dust
 Malva
 Malva Arborea, *vide* Althæa
 Malus
 Malus Armeniaca, *vide* Armeniaca
 Malus Aurantia, *vide* Aurantia
 Malus Limonia, *vide* Limonia
 Malus Medica, *vide* Citreum
 Malus Persica, *vide* Persica
 Mandrake, *vide* Mandragora
 Lady's Mantle, *vide* Alchimilla
 Maple, *vide* Acer
 Maracock, *vide* Granadilla
 March
 Marjoram, *vide* Marjorana
 Bastard Marjoram, *vide* Origanium
 Marle
 Marrubiastrum
 Marrubium
 Marrubium Nigrum, *vide* Ballore
 Marsh Elder, *vide* Opulus
 Martagon, *vide* Liliū
 Marvel of Peru, *vide* Jalapa
 Marum
 Marum Vulgare, *vide* Mastichina
 Marygold, *vide* Caltha.
 African Marygold, *vide* Tagetes
 Corn Marygold, *vide* Chrysanthemum
 French Marygold, *vide* Tagetes
 Fig Marygold, *vide* Ficoides
 Marsh Marygold, *vide* Populago
 Master-wort, *vide* Imperatoria, also Astrantia
 Mastick, *vide* Marum
 Mastick Thyme, *vide* Mastichina
 Mastick-tree, *vide* Lentiscus, also Molle
 Mastichina
 Matricaria
 Matted Roots
 Maudlin, *vide* Ageratum
 May
 May-weed, *vide* Chamæmelum foetidum
 Mayz
 Meadow Rue, *vide* Thalictrum
 Meadow Saffron, *vide* Colchicum
 Mealy-tree, *vide* Viburnum
 Medica
 Medick, *vide* Medica
 Medick Vetchling, *vide* Onobrychis
 Medica Cochleata
 Medicago
 Medlar, *vide* Mespilus
 Melancholy Thistle, *vide* Cirsium
 Melampyrum
 Melianthus
 Melilot, *vide* Melilotus
 Melissa
 Melissa Turcica, *vide* Moldavica
 Melo
 Melocactus
 Melo Carduus, *vide* Melocactus
 Melon, } *vide* Melo
 Musk Melon, }
 Melon Thistle, *vide* Melocactus
 Melongena
 Melopepo
 Melonry
 Mentha
 Mentha Cataria, *vide* Cataria
 Spik'd-mint, Spear-mint, Pepper-mint, Water-mint, Orange-mint, *vide* Mentha
 Menyanthes

Mercurialis

I N D E X.

Mercurialis
 Mercury, *vide* Mercurialis
 Mespilus
 Methonica
 Meum
 Mezereon
 Microscope
 Mildew
 Milfoil, *vide* Millefolium
 Milium
 Milkwort, *vide* Polygala
 Millet, *vide* Milium
 Miltwaste, *vide* Asplenium
 Mimosa
 Mirabilis Peruviana, *vide* Jalapa
 Mistletoe, *vide* Viscum
 Mitella
 Mock Orange, *vide* Syringa
 Mock Privet, *vide* Phillyrea
 Moldavica
 Molle
 Molucca Balm, *vide* Molucca
 Moly
 Momordica
 Money-wort, *vide* Nummularia
 Monks Rhubarb, *vide* Lappathum
 Moon-wort, *vide* Lunaria
 Monks-hood, *vide* Aconitum
 Cæruleum
 Moon Trefoil, *vide* Medicago
 Morus
 Moss, *vide* Muscus
 Mother-wort, *vide* Cardiac
 Mother of Thyme, *vide* Serpillum
 Mould
 Mountain-heath, *vide* Saxifraga
 Mouse-ear, *vide* Auricula Muris, *also* Myosotis
 Mucilage
 Mucilaginous
 Mullein, *vide* Verbascum
 Moth Mullein, *vide* Blattaria
 Mug-wort, *vide* Artemisia
 Mulberry-tree, *vide* Morus
 Mulberry-blight, *vide* Chenopodium
 Mummy
 Musa
 Muscari
 Muscipula, *vide* Lychnis
 Muscose }
 Muscous }
 Muscosity
 Muscus
 Mushrooms
 Mustard, *vide* Sinapi
 Mithridate Mustard, *vide* Thlaspi
 Bastard Mithridate Mustard, *vide* Thlaspidium
 Tower Mustard, *vide* Turritis
 Myosotis

Myrrhis
 Myrtle-tree, *vide* Myrtus
 Myrtus
 Myrtus Brabantica, *vide* Gale

N

N Apellus, *vide* Aconitum
 Narcissus
 Narcisso Leucoium
 Naseberry-tree, *vide* Anona
 Nasturtium
 Nasturtium Indicum, *vide* Acriviola
 Natural
 Natural Faculty
 Nature
 Navel-wort, *vide* Cotyledon
 Venus Navel-wort, *vide* Omphalodes
 Water Navel-wort, *vide* Hydrocotyle
 Navew, *vide* Napus
 Nebulose
 Nebulous
 Nectarine
 Nemoral
 Nemorose
 Nepeta, *vide* Cataria
 Nerves
 Nettle, *vide* Urtica
 Nettle-tree, *vide* Celtis
 Dead-nettle, *vide* Lamium
 Stinking Dead-nettle, *vide* Galeopsis
 Deadly Nightshade, *vide* Belladonna
 American Nightshade, *vide* Phytolacca
 Nicotiana
 Nigella
 Nigellastrum
 Nightshade, *vide* Solanum
 Enchanters Nightshade, *vide* Circea
 Climbing Night-shade, *vide* Basella
 Nil, *vide* Anil
 Nipple-wort, *vide* Lampsana
 Nifolia
 Nitre
 Noli me tangere, *vide* Bala-mina mas
 Non-such, *vide* Lychnis
 None-so-pretty, *vide* Geum
 Nose-bleed, *vide* Millefolium
 Northern Aspect
 November
 Nuciferous
 Nummularia
 Peas Earth-nut, *vide* Lathyrus
 Nursery
 Nut, *vide* Nux
 Physick-nut, *vide* Ricinoides
 Nux Avellana
 Nux Juglans

Nux Vesicaria, *vide* Staphylo-dendron
 Nymphæa

O

O Ak, *vide* Quercus
 Ever-green Oak, *vide* Ilex
 Oak of Jerusalem, *vide* Chenopodium
 Oak of Cappadocia, *vide* Chenopodium
 October
 Oculus Christi, *vide* Horminum Sylvestre
 Oenanthe
 Olea
 Oily-grain, *vide* Sesamum
 Olive-tree, *vide* Olea
 Omphalodes
 One-berry, *vide* Herba Paris
 Onions, *vide* Cepa
 Onobrychis
 Opulus
 Opuntia
 Orach, *vide* Atriplex
 Orange-tree, *vide* Aurantium
 Mock Orange-tree, *vide* Syringa
 Orange-mint, *vide* Mentha
 Orchard
 Orchis
 Origanum
 Organy, *vide* Origanum
 Ornithogalum
 Ornithopodium
 Orobus
 Orpine, *vide* Anacampteros
 Wild Orrach or Orach, *vide* Chenopodium
 Stinking Orrach, *vide* Chenopodium
 Osier, *vide* Salix
 Ox-eye, *vide* Bupthalmum
 Oxyacantha, *vide* Berberis
 Ox-lips, *vide* Primula Veris
 Ox-eye Daisy, *vide* Leucanthemum

P

P Adus, *vide* Cerasus
 Pæonia
 Paigles, *vide* Primula Veris
 Paliurus
 Palma
 Palm-tree, *vide* Palma
 Palma Christi, *vide* Ricinus
 Panicle
 Pansies, *vide* Viola Tricolor
 Papaver
 Papaver Corniculatum, *vide* Glaucium
 Papaver Spinosum, *vide* Argemone
 Papaya

I N D E X.

Papaya
 Papaw-tree, *vide* Papaya
 Papilionaceous
 Pappose Plants
 Paradise-apple, *vide* Malus
 Parasitical Plants
 Parietaria
 Parsley, *vide* Apium
 Bastard Parsley, *vide* Caulalis
 Fools Parsley, *vide* Cicuta
 Parterre
 Parsnip, *vide* Pastinaca
 Prickly-headed Parsnip, *vide* Echinophora
 Pasque Flower, *vide* Pulsatilla
 Passion Flower, *vide* Granadilla
 Herb Patience, *vide* Lappathum
 Pavia
 Pigeon-Pea, *vide* Phaseolus in *Suppl.*
 Peach, *vide* Persica
 Pear-tree, *vide* Pyrus
 Peas, *vide* Pisum
 Peas-everlasting, *vide* Lathyrus
 Heart-peas, *vide* Corindum
 Peas Earth-nut, *vide* Lathyrus
 Pedicle
 Pellitory of the Wall, *vide* Parietaria
 Double Pellitory, *vide* Ptar-mica
 Pennated
 Penny-royal, *vide* Pulegium
 Pentapetalous
 Pentaphylloides
 Peony, *vide* Pæonia
 Pepo
 Pepper-mint, *vide* Mentha
 Water Pepper, *vide* Persicaria
 Perennial Plants
 Periclymenum
 Periploca
 Periwinkle, *vide* Pervinca
 Persica
 Persicaria
 Pervinca
 Petals
 Parasites
 St. Peter's-wort, *vide* Ascy-rum
 Petroselinum, *vide* Apium
 Petty-whin, *vide* Anonis
 Peucedanum
 Phalangium
 Pheasants-eye, *vide* Adonis
 Phaseoloides
 Phaseolus
 Phillyrea, *vide* Alaternus
 Phlomis
 Physick-nut, *vide* Ricinoides
 Phytolacca
 Pile-wort, *vide* Chelidonia
 Pilosella, *vide* Hieracium

Pimpinella
 Pinafter, *vide* Pinus Sylvestris.
 Pine-tree, *vide* Pinus
 Ground Pine, *vide* Chamæ-pytis
 Pine-apple, *vide* Anana
 Pink, *vide* Caryophyllus
 Indian Pink, *vide* Caryophyl-lus Sinensis
 Pimpillow, *vide* Opuntia
 Pipe-tree, *vide* Lilac
 Pudding Pipe-tree, *vide* Cas-sia Fistula
 Pipperidge-tree, *vide* Berberis
 Pisshamin, *vide* Guajacana
 Pistachia, *vide* Terebinthus
 Pisum
 Pisum Cordatum, *vide* Corin-dum
 Plane-tree, *vide* Platanus
 Planta
 Plantain-tree, *vide* Musa
 Planting
 Planting Reverse
 Bucks-horn Plantain, *vide* Coronopus
 Platanus
 Plumb-tree, *vide* Prunus
 Plumbago
 Poinciana
 Virginian Poke, *vide* Phyto-Pork Physick } *vide* lacca.
 Polemonium
 Poison-tree, *vide* Toxicoden-dron
 Poley, *vide* Polium
 Polium
 Polianthus, *vide* Primula Veris
 Polygala
 Polygonatum
 Polypody, *vide* Polypodium
 Pomegranate, *vide* Punica
 Pomum Adami, *vide* Auran-tium
 Populago
 Poplar-tree, *vide* Populus
 Spatling Poppy, *vide* Lych-nis
 Poppy, *vide* Papaver
 Horned Poppy, *vide* Glau-cium
 Prickly Poppy, *vide* Arge-mone
 Populus
 Porrum
 Portulaca
 Potatoes, *vide* Solanum
 None-so-pretty, *vide* Geum
 Primrose, *vide* Primula Veris
 Primrose-tree, *vide* Onagra
 Privet, *vide* Ligustrum
 Pruning of Trees
 Prunus
 Pseudo-acacia
 Pseudo-dictamnus
 Psyllium
 Ptarmica

Pulegium
 Pulmonaria
 Pulsatilla
 Pumpkin, *vide* Pepo, Melo-Pumpion } *vide* pepo
 Punica
 Purslain, *vide* Portulaca
 Pyracantha, *vide* Mespilus
 Pyrus

Q

Quamoclit
 Queen's Violet, *vide* Hesperis
 Quercus
 Quick
 Quick-beam, *vide* Sorbus Syl-vestris
 Quicken-tree, *vide* Sorbus
 Quince-tree, *vide* Cydonia
 Quincunx Order
 Quinquefolium

R

Racemiferous
 Racemus
 Radiated Flowers
 Radicle
 Radish, *vide* Raphanus
 Horse Radish, *vide* Cochlea-ria
 Rag-wort, *vide* Jacobæa; also Doria
 Ragged Robin, *vide* Lychnis
 Rain
 Rainbow
 Rampions, *vide* Campanula radice esculente
 Ramsons, *vide* Allium Syl-vestre
 Ranunculus
 Rapa
 Raphanus
 Rapuntium
 Raspberry-bush, *vide* Rubus
 Reed, *vide* Arundo
 Rest-harrow, *vide* Anonis
 Rhabarbarum Monachorum, *vide* Lapathum
 Rhamnoides
 Rhamnus
 Monks Rhubarb, *vide* Lapa-thum
 Rhus
 Ribes
 Rice, *vide* Oryza
 Ricinoides
 Ricinus
 Rie, *vide* Secale
 Ripening of Fruits
 Rocambole, *vide* Allium Sa-tivum
 Rocket,

I N D E X.

Rocket, *vide* *Eruca*
 Corn Rocket, *vide* *Erucago*
 Rocket the Double, *vide* *Hesperis*
 Rock-rose, *vide* *Cistus*
 Golden Rod, *vide* *Virga Aurea*
 Root
 Hollow Root, *vide* *Fumaria*
 Rosa Sinensis, *vide* *Ketmia Sinensis*
 Gelder Rose, *vide* *Opulus*
 Rose-tree, *vide* *Rosa*
 Rose Root, *vide* *Anacampferos*
 Rosemary, *vide* *Rosmarinus*
 Rubia
 Rubus
 Rue, *vide* *Ruta*
 Goats Rue, *vide* *Galega*
 Wall Rue, *vide* *Ruta Muraria*
 Wild Rue, *vide* *Harmala*
 Cheese Runnet, *vide* *Gallium*
 Rupture-wort, *vide* *Herniaria*
 Ruscus
 Flowering Rush, *vide* *Buto-mus*
 Ruta
 Ruta Canina, *vide* *Scrophularia*
 Ruta Muraria
 Rye, *vide* *Secale*.

S

Sabina
 Saffron, *vide* *Crocus*
 Meadow Saffron, *vide* *Colchicum*
 Sage, *vide* *Salvia*
 Sage-tree, *vide* *Phlomis*
 Jerusalem Sage, *vide* *Phlomis*
 Saint-Foin, *vide* *Onobrychis*
 Shrubby wild Sage, *vide* *Scordium*
 Salicaria
 Salix
 Corn-Sallet, *vide* *Valerianella*
 Salt
 Salvia
 Salvia Agrestis, *vide* *Scordium*
 Sambucus
 Samphire, *vide* *Crithmum*
 Sand
 Sanguis Draconis, *vide* *Palma*
 Sanicle, *vide* *Geum*
 Sanicula
 Santolina
 Sap
 Saponaria, *vide* *Lychnis*
 Sappadilla, *vide* *Anona*
 Saffra-tree, *vide* *Cornus*

Satten Flower, *vide* *Lunaria*
 Satureia
 Satyrion, *vide* *Orchis*
 Sauce-alone, *vide* *Alliaria*
 Savin, *vide* *Sabina*
 Savory, *vide* *Satureia*
 Saxifraga
 Golden Saxifrage, *vide* *Chrysosplenium*
 Scabiosa
 Sciatica Cress, *vide* *Lepidium*
 Scilla
 Sclarea
 Scordium
 Scorpioides
 Scorpion Senna, *vide* *Emerus*
 Scorzonera
 Scrophularia
 Scrupose
 Scurvy-grass, *vide* *Cochlearia*
 Sea Buckthorn, *vide* *Rhamnus*
 Sea Pink, *vide* *Statice*
 Sea Lavender, *vide* *Limonium*
 Secale
 Securidaca
 Sedum
 Seed
 Self-heal, *vide* *Brunella*
 Seminary
 Semi-fistular Flowers
 Seminal Leaves
 Senecio
 Senna
 Bastard Senna, *vide* *Colutea*
 Bladder Senna, *vide* *Colutea*
 Scorpion Senna, *vide* *Emerus*
 Sensible Plant, *vide* *Mimosa*
 September
 Septifolious Plants
 Serpillum
 Service-tree, *vide* *Sorbus*
 Wild Service-tree, *vide* *Crataegus*
 Sefamum
 Shepherd's Purse, *vide* *Bursa*
 Shepherd's Pouch, *vide* *Pastoris*
 Shepherd's Teasel, *vide* *Dipsacus*
 Sideration
 Siliqua
 Siliquastrum
 Virginian Silk, *vide* *Periploca*
 Siliquous
 Silver-bush, *vide* *Barba Jovis*
 Sinapi
 Sinapistrum
 Sifarum
 Skull-cap, *vide* *Cassida*
 Skirret, *vide* *Sifarum*
 Lady's Slipper, *vide* *Helleborine*
 Sloe-tree, *vide* *Prunus*
 Smallage, *vide* *Apium*
 Smilax
 Smyrnium
 Snail Trefoil, *vide* *Medica Cochlearia*

Snap-tree, *vide* *Adhatoda*
 Snap-dragon, *vide* *Antirrhinum*
 Snake-weed, *vide* *Bistorta*
 Sneez-wort, *vide* *Parmica*
 Snow
 Snow-drop, *vide* *Narcissus*
 Snow-drop-tree, *vide* *Arbor Zeylanica*
 Double Soap-wort, *vide* *Lychnis*
 Soil
 Solanum
 Fresh-water Soldier, *vide* *Aloides*
 Solomon's-seal, *vide* *Polygonatum*
 Solstice
 Sonchus
 Sorbus
 Sorrel, *vide* *Acetosa*
 Southern-wood, *vide* *Abrotanum*
 Sow-bread, *vide* *Cyclamen*
 Sowre-fops, *vide* *Anona*
 Sparrow-grass, *vide* *Asparagus*
 Spartium
 Spatling-poppy, *vide* *Lychnis*
 Speedwell, *vide* *Veronica*
 Spider-wort, *vide* *Phalangium* and *Ephemerum*
 Spike-mint, *vide* *Mentha*
 Spear-mint, *vide* *Mentha*
 Spignel, *vide* *Meum*
 Spina Alba, *vide* *Mespilus*
 Spinachia
 Spinage, *vide* *Spinachia*
 Spindle-tree, *vide* *Euonymus*
 Spleen-wort, *vide* *Asplenium*
 Rough Spleen-wort, *vide* *Lonchitis*
 Spiraea Frutex
 Spurge, *vide* *Cataputia* & *Tithymalus*
 Bastard Spurge, *vide* *Tithymaloides*
 Spurge Laurel, *vide* *Thymelæa*
 Squashes, *vide* *Melo-pepo*
 Squils, *vide* *Scilla*
 Stachys
 Stag's horn-tree, *vide* *Rhus*
 Stamina
 Stameneous Flowers
 Staphylodendron
 Star-wort, *vide* *Aster*
 Star-flower, *vide* *Ornithogalum*
 Yellow Star-wort, *vide* *Asteriscus*
 Statice
 Statues
 Stellate Plants
 Sterility
 Stickadore, *vide* *Stoechas*
 Stock-gilly-flower, *vide* *Leucoium*

Stoechas

I N D E X.

Stoechas
Dwarf Annual Stock, *vide* Hesperis
Stone-crop, *vide* Sedum
Stone-crop-tree, *vide* Vermicularis Frutex
Stoves
Stramonium
Strawberry, *vide* Fragaria
Strawberry-tree, *vide* Arbutus
Strawberry Spinage, *vide* Chenopodio-morus
Styrax
Style
Suber
Subterraneous
Succory, *vide* Cichorium
Gum Succory, *vide* Chondrilla
Succulent Plants
Sugar Cane, *vide* Arundo
Sulphureous
Sweet Sultan, *vide* Cyanus
Sumach, *vide* Rhus
Venice Sumach, *vide* Cotinus Coriaria
Summits
Sun
Little Sun-flower, *vide* Helianthemum
Sun-flower, *vide* Corona Solis
American Sun-flower, *vide* Chrysanthemum Corona Solis
Superficies
Surface
Swallow-wort, *vide* Asclepias
Sweet-William, *vide* Caryophyllus Barbatus
Sweet-Willow, *vide* Gale
Sycamore, *vide* Acer Majus
Symphytum
Syringa

T

TAgetes
Tamarind-tree, *vide* Tamarindus
Tamarisk-tree, *vide* Tamariscus
Tamnus
Tanacetum
Tansey, *vide* Tanacetum
Tanners-bark
Hig or High-taper, *vide* Verbascum
Tare, *vide* Vicia
Tarragon, *vide* Draco Herba
Taxus
Teasel, *vide* Dipfacus
Terebinthus
Tergifacous Plants
Terrasses
Terrene
Terrestrial
Tetrapetalous
Teucrium

Thalictrum
Thapsia
South-Sea Thea, *vide* Cassine
Thermometer
Thistle, *vide* Carduus
Distaff-thistle, *vide* Cnicus
Blessed-thistle, *vide* Cnicus
Melon-thistle, *vide* Melocactus
Sow-thistle, *vide* Sonchus
Globe-thistle, *vide* Echinopus
Torch thistle, *vide* Cereus
Thlaspi
Thlaspidium
Thorn-apple, *vide* Stramonium
Glastenbury-Thorn, *vide* Mespilus
Haw-Thorn, *vide* Mespilus
Egyptian-Thorn, *vide* Acacia
Christ's-Thorn, *vide* Paliurus
Evergreen-Thorn, *vide* Pyracantha
Thrift, *vide* Statice
Thunder
Thuriferous
Thuya
Thyme, *vide* Thymus
Thymelæa
Mother of Thyme, *vide* Serpillum
Hairy wild Thyme, *vide* Serpillum
Lemon Thyme, *vide* Serpillum
Thyme the Marum, *vide* Marum
Thyme the Mastick, *vide* Mastichina
Tilia
Tinus
Tithymaloides
Tithymalus
Toad-flax, *vide* Linaria
Tobacco, *vide* Nicotiana
Tomentum
Tower Mustard, *vide* Turrilis
Toxicodendron
Tragacantha
Tragopogon
Transplanting
Transportation of Plants
Travellers Joy, *vide* Clematitis
Trefoil, *vide* Trifolium
Birds-foot Trefoil, *vide* Lotus
Shrub Trefoil, *vide* Dorycnium
Bean Trefoil, *vide* Cytissus
Moon Trefoil, *vide* Medicago
Snail Trefoil, *vide* Medica Cochleata
Chaste-Tree, *vide* Vitex
Mealy-Tree, *vide* Viburnum
Cork-Tree, *vide* Suber
Tree Germander, *vide* Teucrium
Trifolium
Tripetalous Flowers
Tripolium, *vide* Aster

True Love, *vide* Herba Paris
Trumpet Flower, *vide* Bignonia
Trumpet Honey-suckle, *vide* Periclymenum
Tuberosé, *vide* Hyacinthus
Tuberosus
Tuberous Roots
Tubulous Plants
Tulip, *vide* Tulipa
Tulip-tree, *vide* Tulipifera
African Tulip, *vide* Hæmanthus
Turk's Cap, *vide* Lilium flore reflexo
Turkey Wheat, *vide* Mayz
Turkey Balm, *vide* Moldavica
Turnep, *vide* Rapa
French Turnep, *vide* Navew
Turnsole, *vide* Heliotropium
Tutsan, *vide* Androsæmum
Twa-blade, *vide* Bifolium

V

Vaccaria, *vide* Lychnis
Vaccinia, *vide* Vitis
Idæa
Valerian, *vide* Valeriana
Valeriana
Valeriana Græca, *vide* Polemonium
Valerianella
Vaporiferous
Vapours
Variegated
Vasculiferous Plants
Vase
Vases
Vegetable
Vegetables
Vegetable Staticks
Venus Navel-wort
Veratrum
Verbascum
Verbena
Verge
Veronica
Vervain, *vide* Verbena
Vetch, *vide* Vicia
Bitter Vetch, *vide* Orobus
Horse-shoe Vetch, *vide* Ferum Equinum
Liquorice Vetch, *vide* Apios
Chickling Vetch, *vide* Lathyrus
Medick Vetchling, *vide* Onobrychis
Crimson-grass Vetch, *vide* Nissolia
Hatchet Vetch, *vide* Securidica
Viburnum
Vine, *vide* Vitis
Vincetoxicum, *vide* Asclepias
Viola
Violet, *vide* Viola

Queen

I N D E X.

Queen or Dame's Violet, *vide*
Hesperis
Lesser bulbous Violet, *vide*
Narcisso-Leucoium
Viorna, *vide* Clematitidis
Virga Aurea
Virgin's Bower, *vide* Clematitidis
Virginian Silk, *vide* Periploca
Virginian Acacia, *vide* Pseudo-Acacia
Viscum
Vitex
Vitis
Vitis Idæa
Ulmus
Urtica

W

Widow-wail, *vide* Chamælea
Wake Robin, *vide* Arum
Walks
Walls
Wall-flower, *vide* Leucoium
Walnut, *vide* Juglans
Water
Water Calamint, *vide* Mentha
Water Drop-wort, *vide* Oenanthe

Water Germander, *vide* Scordium
Water Lily, *vide* Nymphæa
Water Pepper, *vide* Persicaria
Water Horehound, *vide* Lycopus
Way-faring Tree, *vide* Viburnum
Weather
Dyers Weed, *vide* Luteola
Yellow Weed, *vide* Luteola
Weld, *vide* Luteola
Wheat, *vide* Triticum
Cow Wheat, *vide* Melampyrum
Indian Wheat, *vide* Mayz
Wilderness
Willow-tree, *vide* Salix
Willow Herb, *vide* Chamænerion, and also Lyfima-
chia
Sweet-willow, *vide* Gale
Willow-wort, *vide* Salicaria
French Willow, *vide* Chamænerion
Whin, *vide* Genista Spinosâ
Petty Whin, *vide* Anonis
Sweet-Williams, *vide* Caryophyllus Barbatus
Wind
Wind-flower, *vide* Anemone
Wine

Wine-Press
Winter Cherry, *vide* Alkekengi
Woad, *vide* Isatis
Wolf's Bane, *vide* Aconitum
Wood of Life, *vide* Guaiacum
Wood-roof, *vide* Asperula
Wormwood, *vide* Abinthium

X

X Eranthemum
Xiphium
Xylon

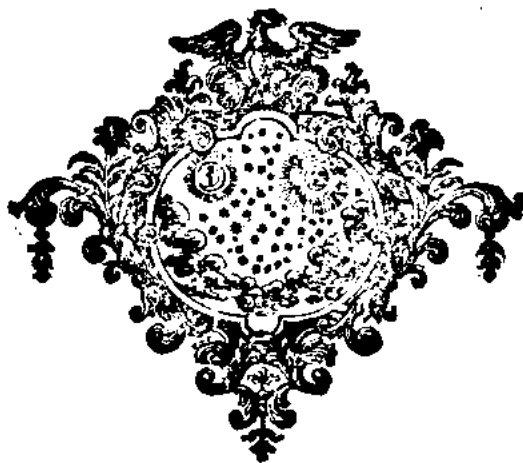
Y

Y Ucca

Z

Z Inziber
Ziziphus

F I N I S.



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